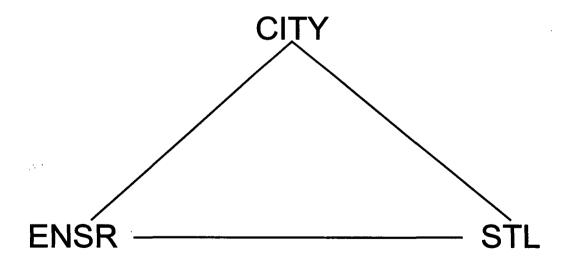


# ANNUAL MONITORING REPORT FOR 2003

REILLY TAR & CHEMICAL CORP.
N.P.L. SITE
ST. LOUIS PARK, MINNESOTA

SUBMITTED MARCH 15, 2004





March 15, 2004

4500 Park Glen Road Suite 210 St. Louis Park, MN 55416-4889 (952) 924-0117 FAX (952) 924-0317 www.ensr.com

Darryl Owens Regional Administrator **United States Environmental** Protection Agency, Region 5 Mail Code HSR-6J 77 West Jackson Boulevard Chicago, Illinois 60604

Site Remediation Section Director, Groundwater and Solid Waste Division Minnesota Pollution Control Agency 520 Lafayette Road North St. Paul, Minnesota 55155

President Reilly Industries, Inc. 300 North Meridian Street, Suite 1500 Indianapolis, Indiana 46204-1763

Re:

United States of America, et al. vs. Reilly Tar & Chemical

Corporation, et al. File No. Civ. 4-80-469 CD-RAP Section 3.4

#### Gentlemen:

Enclosed is the 2003 Annual Monitoring Report, submitted pursuant to Section 3.4 of the Consent Decree-Remedial Action Plan in the above captioned matter. This report is issued by the City in accordance with Section 2(a) of the Reilly/St. Louis Park Agreement (Exhibit B to the Consent Decree).

Any questions regarding this submittal can be directed towards this office.

Sincerely,

William M. Fregg William M. Gregg Project Leader for the City of St. Louis Park

**Enclosure** 

CC:

Ginny Yingling, Minnesota Department of Health

Scott Anderson, City of St. Louis Park

Mike Rardin (w/o enclosures), City of St. Louis Park

#### ANNUAL MONITORING REPORT FOR 2003

#### **SUBMITTED TO THE**

# REGIONAL ADMINISTRATOR UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION V

EXECUTIVE DIRECTOR
MINNESOTA POLLUTION CONTROL AGENCY

BY

THE CITY OF ST. LOUIS PARK, MINNESOTA

PURSUANT TO
CONSENT DECREE - REMEDIAL ACTION PLAN
SECTION 3.4

**UNITED STATES OF AMERICA, ET AL.** 

vs.

**REILLY TAR & CHEMICAL CORPORATION, ET AL.** 

UNITED STATES DISTRICT COURT DISTRICT OF MINNESOTA CIVIL NO. 4-80-469

**MARCH 15, 2004** 



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#### 1.0 INTRODUCTION

Pursuant to Section 3.4 of the Consent Decree - Remedial Action Plan (CD-RAP) in the case of the United States of America, *et al.* vs. Reilly Tar & Chemical Corporation, *et al.*, this report presents the results of all chemical analyses and water level measurements for calendar year 2003 that are not presented in previous reports.

The groundwater monitoring conducted in 2003 was performed in accordance with the methods and procedures identified in the 2003 Sampling Plan. The City of St. Louis Park (City) has overall responsibility for conducting the groundwater monitoring required by the CD-RAP. In accordance with the Sampling Plan, the City was assisted in 2003 by ENSR who collected groundwater samples from monitoring wells and by Severn Trent Laboratories who performed the analyses for PAH and phenolics. In February 2000, Severn Trent Laboratories purchased Quanterra and the laboratory is now known as STL-Denver.

The 2003 monitoring data are presented separately for each aquifer, starting with the Mt. Simon-Hinckley Aquifer, which is the deepest aquifer below the ground surface, and ending with the Drift Aquifer, which is the uppermost aquifer monitored. A series of maps has been prepared to help present the monitoring data. Maps for the Prairie du Chien-Jordan, St. Peter, Platteville, and Drift Aquifers are contained in this report.

A series of tables has been prepared for each aquifer to help present the analytical results since 1988. These tables illustrate trends in PAH concentrations in the groundwater for each monitoring well. The shaded tables represent wells that are no longer monitored as part of the sampling plan or wells that were unavailable for sampling during the scheduled time.

ENSR conducted data validation to assess the quality of the laboratory data. The data quality assessment can be found in the final section of this report.

Each appendix includes a laboratory data package for a set of samples collected and submitted for analysis at the same time. Attached to the end of each data package are data quality assessment reports summarizing the quality of the analytical data contained in each package. The data Appendices are organized chronologically throughout the year, as shown in the Guide to Appended Laboratory Results immediately preceding the Appendices.



#### 2.0 MT. SIMON-HINCKLEY AQUIFER

In accordance with RAP Section 5.1, the Mt. Simon-Hinckley Aquifer monitoring wells were sampled once in 2003. Well SLP17 was out of service and no samples were collected from it in 2003. A total of three wells were used to collect groundwater samples during 2003. The 2003 analytical data for the Mt. Simon-Hinckley wells are shown on Figure 2-1. The laboratory reports of the analytical data are included in the Appendices. The Guide to Appended Laboratory Results for all of 2003 precedes the Appendices.

The advisory levels for the sum of benzo(a)pyrene and dibenz(a,h)anthracene, carcinogenic PAH, and Other PAH are 3, 15 and 175 nanograms/liter (ng/l or parts per trillion), respectively. Table 2-1 lists the historic results since 1988 of other PAH and carcinogenic PAH data collected from the three wells. The 2003 data indicate that the sums of the concentrations of benzo(a)pyrene and dibenz(a,h)anthracene, carcinogenic PAH, and other PAH in wells SLP12 and SLP13 were below the advisory levels for these compounds. However, the laboratory analytical results for well SLP11 indicated 45.7 ng/l of total carcinogenic PAH. This result is above the advisory level and drinking water criterion, and is surprising given the historical paucity of carcinogenic PAH in this well, other Mt. Simon-Hinckley Aquifer wells, and other municipal drinking water supply wells. The well was turned off in October 2003. Additional sampling was not completed in 2003. More recent testing confirms the historical levels of PAH in well SLP11. It appears that the Mt. Simon-Hinckley Aquifer has not been significantly affected by contaminants originating from the former Reilly Tar & Chemical (Reilly) site.

## NON-RESPONSIVE



REILLY SITE

SLP 17

WELL LOCATION
WELL IDENTIFICATION
WATER LEVEL
SUM-BENZO(a)PYRENE & DIBENZ(a,h)ANTHRACENE (PPT)
SUM-CARCINOGENIC PAH (PPT)
SUM-OTHER PAH'S (PPT)

Concentration in nanograms per liter equivalent to parts per trillion

#### FIGURE 2-1

SUMMARY OF GROUNDWATER MONITORING RESULTS FOR MOUNT SIMON HINKLEY AQUIFER 2003

DRAWN:	A. TARARA	DATE:	2/27/04	REV:
CHECKED:	WMG	PROJECT:	01620-032	



#### Table 2-1 Historical Summary of Other PAH and **CPAH Analytical Results** 1988 through 2003

Mt. Simon SLP11,12,13,17

All concentrations reported in nanograms per liter (ng/l).

	SLP17	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	-0	12
6-89	0	12
6-90	1	18
3-91	0	41
11-92	3	41
6-93	0	12
12-94	4	35
10-95	0	- 8
6-96	0	5
10-97	62	406
5-98	0	3
5-99	0	40
9-00	Out o	f Service

	SLP12	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
6-88	0	11
6-89	0	16
3-90	0	109
3-91	0	21
5-92	1	25
3-93	0	9
3-94	0	21
10-95	0	9
6-96	0	3
10-97	0	12
5-98	0	3
9-99	0	10
9-00	0	11
8-01	0	2
9-02	3	7
8-03	0	2

	SLP13	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
6-88	0	15
6-89	0	9
3-90	0	14
3-91	0	13
5-92	2	11
6-93	0	11
12-94	0	28
10-95	0	9
6-96	0	5
10-97	0	22
5-98	0	4
5-99	0	15
9-00	0	6
8-01	0	0
9-02	0	0
8-03	0	0

	SLP11	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
6-88	O <sub>3</sub>	42
6-89	0	34
90	Out o	of Service
3-91	0	43
5-92	0	43
3-93	0	50
3-94	0	66
10-95	3	113
6-96	0	109
10-97	0	78
5-98	0	70
5-99	Ó	151
9-00	0	22
8-01	0	19
9-02	Out o	f Service
8-03	46	37

benzo(a) anthracene

quinoline\*

benzo(a)pyrene benzo(b)flouranthene dibenz(a,h)anthracene indeno(1,2,3-cd)pyrene benzo(i)fluoranthene\*\*

\*Quinoline is included in the sum of CPAH if other CPAHs were detected. If no CPAHs are detected, quinoline is included in the Total Other PAH.

\*\*Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene. Benzo(j)flouranthene can not be consistently separated by the laboratory. Therefore, if present, it will be reported as benzo(b)- and/or benzo(k)-fluoranthene.

<sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2), consists of the sum of:

acenapthene benzo(e)pyrene acenaphthylene

acridine

benzo(b)thiophene biphenyl

fluoranthene fluorene

1-methylnaphthalene 2-methylnaphthalene naphthalene

anthracene benzo(k)fluoranthene 2.3-benzofuran

carbazole dibenzothiophene

indole

perylene phenanthrene pyrene

<sup>&</sup>lt;sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1)), consist of the sum of:

<sup>&</sup>lt;sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit.



#### 3.0 IRONTON-GALESVILLE AQUIFER

Analytical results from groundwater samples collected during 1987 through 1991 from well W105 had consistently met the criterion (less than 10 parts per billion [10,000 parts per trillion] total PAH) for discontinuing the 25 gallons per minute (gpm) pumping rate. Therefore, in accordance with CD-RAP Section 6.1.5, the pump in well W105 was inactivated on December 23, 1991, and remains inactivated.

Well W105 is required to be sampled once per year on the even-numbered years (i.e. 2002, 2004, 2006). Groundwater samples were not required to be collected from well W105 in 2003.

The historical analytical results for well W105 from 1988 through 2003 are presented on Table 3-1. Concentrations have remained below the 10,000 ng/l cessation criterion since well W105 ceased pumping in 1991.

#### Table 3-1

### Historical Summary of Other PAH and CPAH in Well W105 1988 Through 2003

All concentrations repoprted in nanograms per liter (ng/l).

	W105	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
2-88	0 3	9,000
6-88	0	2,400
9-88	0	3,670
12-88	0	2,035
6-89	0	1,400
12-89	0	1,086
5-90	0	2,347
8-90	0	2,600
5-91	9.5	2,164
8-91.	0	1,014
2-92	0	2,185
6-92	355	5,057
11-92	0	30,900
1-93	38	1,797
1-93	23	1,966
3-94	60	2,576
5-96	29	2,746
4-98	0	5,493
5-00	89	5,593
6-02	142	5,247

#### NOTES:

benzo(a) anthracene

indeno(1,2,3-cd)pyrene

benzo(a)pyrene

quinoline\*

benzo(b)flouranthene

benzo(j)fluoranthene\*\*

chrysene

benzo(g,h,i)perylene

dibenz(a,h)anthracene

<sup>&</sup>lt;sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2)), consists of the sum of:

acenapthene	biphenyl	indene
acenaphthylene	carbazole	indole
acridine	dibenzofuran	1-methylnaphthalene
anthracene	dibenzothiophene	2-methylnaphthalene
benzo(k)fluoranthene	2,3-dihydroindene	naphthalene
2,3-benzofuran	fluoranthene	perylene
benzo(e)pyrene	fluorene	phenanthrene
benzo(b)thiophene		pyrene

<sup>&</sup>lt;sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit

<sup>&</sup>lt;sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1), consist of the sum of:

<sup>\*</sup>Quinoline is included in the sum of CPAH if other CPAHs were detected. If no CPAHs are detected, quinoline is included in the Total Other PAH.

<sup>\*\*</sup>Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene. Benzo-(j)flouranthene can not be consistently separated by the laboratory. Therefore if present, it will be reported as benzo(b)- and/or benzo(k)-fluoranthene.



#### 4.0 PRAIRIE DU CHIEN-JORDAN AQUIFER

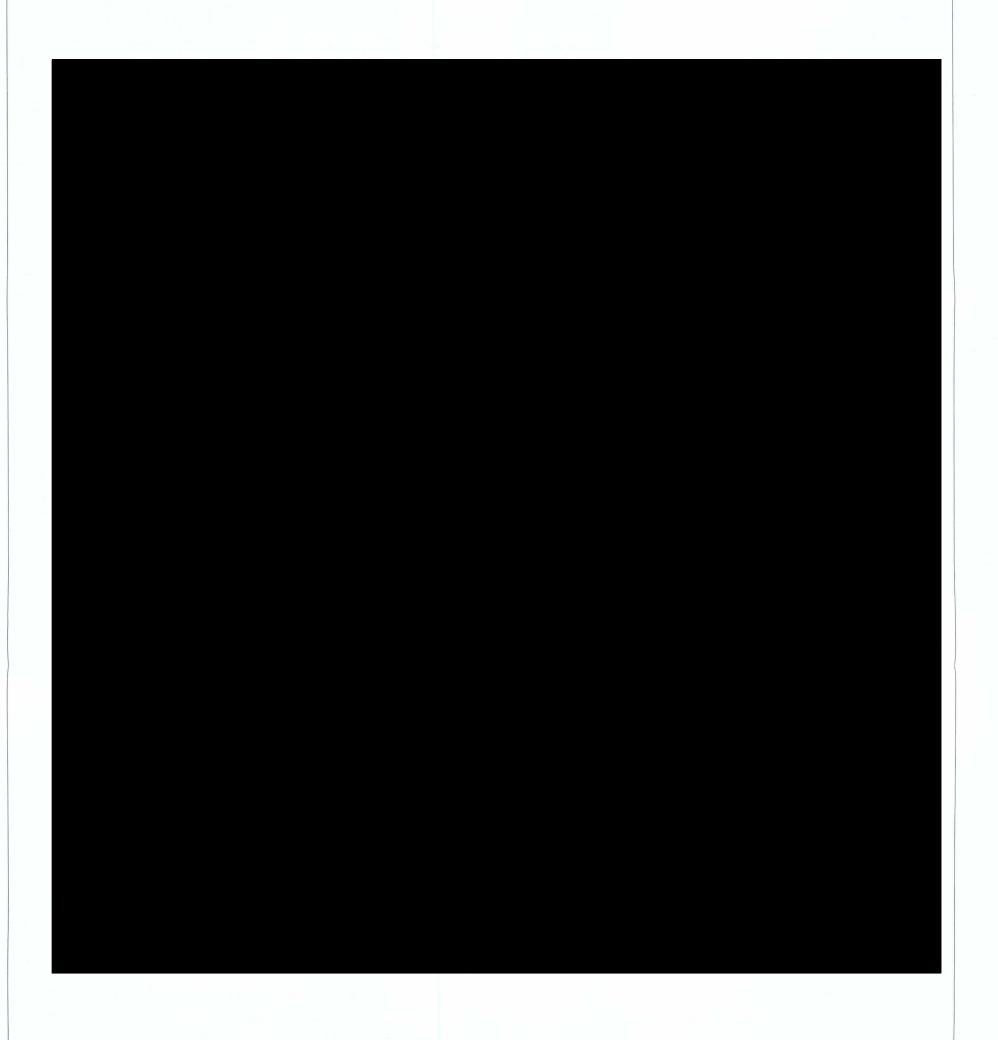
Prairie du Chien-Jordan Aquifer wells were monitored in accordance with the 2003 Sampling Plan. In addition to water quality monitoring, groundwater elevations were measured at the Prairie du Chien-Jordan Aquifer wells on April 18, and August 1, 2003. A total of 20 wells were used to collect groundwater samples during 2003.

Summaries of analytical data and groundwater elevations for the sampling rounds are shown in Figures 4-1 and 4-2. These two figures indicate that groundwater flow in the aquifer is greatly affected by the pumping of wells and is dependent upon the pumping rate and the time the specific measurements were recorded (e.g., pump may have been recently shut off, or turned on). Some of the municipal wells (i.e. SLP10/15, E7, and SLP4) pump at greater than 1,000 gpm and have a considerable effect on localized groundwater flow. However, these wells systematically turn on and turn off, therefore, the general groundwater flow is affected by which wells are pumping and at what rates. According to several literature resources, including the USGS (Water Supply Paper 2211, 1984), Norvitch and others (Water Resources Outlook of the Minneapolis and St. Paul Metropolitan Area, 1973), the general groundwater flow in the Prairie du Chien-Jordan Aquifer is towards the east. Figures 4-1 and 4-2 indicate a snapshot in time of the groundwater flow and are not indicative of the long-term flow.

Table 4-1 presents a historical summary of analytical results from 1988 through 2003 for Prairie du Chien-Jordan Aquifer wells. The laboratory reports of the analytical data are included in the Appendices. The Guide to Appended Laboratory Results for all of 2003 precedes the Appendices.

The advisory levels for the sum of benzo(a)pyrene and dibenz(a,h)anthracene, carcinogenic PAH, and Other PAH are 3, 15 and 175 nanograms/liter (ng/l or parts per trillion), respectively. The sums of the concentrations of benzo(a)pyrene and dibenz(a,h)anthracene, carcinogenic PAH, and other PAH were below the drinking water criteria levels of 280ng/l in all of the Prairie du Chien-Jordan Aquifer municipal drinking water supply wells, except for wells SLP4 and SLP10. These wells are treated with granular activated carbon prior to use. W23 is also treated with carbon prior to discharge into the storm water system. Carcinogenic PAH were detected in seven of the 20 wells that were sampled. Concentrations of carcinogenic PAH ranged from 1ng/l in W119 to 514 ng/l in W23.

The amount and distribution of PAH in the aquifer in 2003 was consistent with historical patterns and continues to show a decreasing trend of PAH concentrations in most of the wells. For example, no PAH were detected in well W70 in 2003.



## **LEGEND**



Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppt)
Total Carcinogenic PAH (ppt)
Total Other PAH (ppt)
0 = Not detected
- = Not sampled



5 Foot Groundwater Level Contour



### FIGURE 4-1

Summary of Groundwater Monitoring Results Prairie Du Chien-Jordan Aquifer First Half, 2003

DRAWN:	DATE:	REV:	
A. DESILETS	2/23/2004		
CHECKED:	PROJECT:		1
B. GREGG	1620-032		





### **LEGEND**



Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppt)
Total Carcinogenic PAH (ppt)
Total Other PAH (ppt)
0 = Not detected
- = Not sampled



5 Foot Groundwater Level Contour



## FIGURE 4-2

Summary of Groundwater Monitoring Results Prairie Du Chien-Jordan Aquifer Second Half, 2003

DRAWN: A. DESILETS	DATE: 2/23/2004	REV:
CHECKED: B. GREGG	PROJECT: 1620-032	1



All concentrations reported in nanograms per liter (ng/l)

SLP4			
Sampling Date	Total CPAH <sup>1</sup>		Total Other PAH <sup>2</sup>
8-88	0 3		244
10-89	0		232
3-90	0		210
6-90	2		239
11-92	3		309
3-93	0		237
6-93	0		259
3-94	0		552
10-94	1		571
9-95	3		561
12-95	6		229
6-96	0		431
9-96	0		526
4-97	0		596
9-97	0		533
4-98	0		440
9-98	1		361
11-98	5		91
5-99	0		485
8-99	0		328
5-00	0		465
9-00	0		376
5-01	3	_	397
5-02	0		281
5-03	0		249

SLP4			
Sampling Date	Total CPAH	1	Total Other PAH <sup>2</sup>
8-88	0 3		244
10-89	0		232
3-90	0		210
6-90	2		239
11-92	3		309
3-93	0		237
6-93	0		259
3-94	0		552
10-94	1		571
9-95	3		561
12-95	6		229
6-96	0		431
9-96	0		526
4-97	0		596
9-97	0		533
4-98	0		440
9-98	1		361
11-98	5		91
5-99	0		485
8-99	0		328
5-00	0		465
9-00	0		376
5-01	3	^	397
5-02	0		281
5-03	0		249

SLP10			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	
8-88	0	8,200	
10-89	0	5,120	
6-90	0	5,403	
8-90	0	7,386	
5-91	5	315	
6-92	0	3,070	
8-93	0	2,091	
6-94	0	2,174	
6-95	0	1,737	
6-96	0	1,742	
10-97	0	1,859	
5-98	0	1,354	
5-99	0	1,452	
5-00	0	2,947	
5-01	0	1,929	
6-02	2	1,453	
9-03	8	1,327	

	SLP5			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH		
10-88	0	613		
6-89	. 0	94		
6-90	0	49		
5-91	1	42		
6-92	1	71		
8-93	5			

SLP8			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	
8-88	0	18	
6-89	0	8	
10-89	0	9	
3-90	0	15	
3-91	0	50	
5-92	1	19	
11-92	2	9	

SLP14			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	
8-88	0	112	
6-89	0	134	
9-89	0	84	
3-90	0	98	
8-90	0	145	
5-91	1	99	
8-91	0	19	
5-92	1	90	
8-93	0	78	
9-94	0	57	
6-95	0	89	
6-96	0	52	
4-97	0	46	
5-98	0	55	
5-99	0	49	
5-00	0	50	
5-02	0	25	

SLP6				
Sampling	Total	Total		
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>		
8-88	0	33		
10-88	0	55		
6-89	7	52		
9-89	0	36		
10-89	0	40		
3-90	0	45		
6-90	3	80		
8-90	0	117		
10-90	0	68		
8-91	0	123		
5-92	1	123		
11-92	0	173		
3-93	0	212		
6-93	0	113		
2-94	1	74		
6-95	0	88		
6-96	1	180		
8-96	0	178		
10-96	0	189		
1-97 2-97	0	236 210		
3-97	0	277		
6-97	0	217		
5-98	0	146		
8-98	0	173		
8-99	0	174		
5-00	0	218		
8-01	o	158		
11-01	0	138		
3-02	0	181		
5-02	0	189		
9-02	0	219		
10-02	0	178		
3-03	0	124		
5-03	0	165		
8-03	5	137		
11-03	0	238		

	SLP7	Section 1
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	78
10-88	0	51
6-89	- 0	61
9-89	. 0	25
10-89	0	- 25
3-90	- 0	43
6-90	2.	48
8-90	. 2	91
10-90	0 *	49
3-91	0	50
5-91	- 0	37
8-91	0	65
5-92	1	40
3-93	0	32
6-94	0	60
6-95	= +0	28
6-96	0	22
4-97	0	11 💮
5-98	0	17
5-99	0	17
v	vell not in se	ervice

	SLP15	
Sampling Date	Total CPAH1	Total Other PAH <sup>2</sup>
6-89	0	4,026
11-92	0	3,206
8-93	. 0	2,091

All concentrations reported in nanograms per liter (ng/l)

SLP16			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	
8-88	0	48	
6-89	0	28	
9-89	0	24	
8-90	8	374	
11-90	0	59	
5-91	1	32	
8-91	0	64	
11-92	1	42	
8-93	0	11	
6-94	0	22	
6-95	0	13	
6-96	0	8	
9-97	0	9	
5-98	0	7	
5-99	0	0	
5-00	0	9	
5-02	0	0	

E13			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	
8-88	0	4	
6-89	0	20	
9-89	0	6	
6-90	0	13	
8-90	2	227	
5-91	1	11	
8-91	0	12	
5-92	0	43	
8-93	0	4	
6-94	0	3	
6-96	0	3	
10-96	0	4	
4-97	0	38	
10-97	0	8	
5-98	0	21	
8-98	0	36	
5-99	0	15	
8-99	0	35	
5-00	0	39	
9-00	0	49	
5-01	0	41	
5-02	0	80	
8-03	7	87	

E2			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	
8-88	0	14	
6-89	0	21	
9-89	0	8	
6-90	3	22	
8-90	0	14	
5-91	4	21	
8-91	0	17	
5-92	0	19	
8-93	0	9	
6-94	0	16	
12-95	0	10	
6-96	0	14	
10-96	0	20	
4-97	0	45	
10-97	0	13	
5-98	0	13	
8-98	0	196	
10-98	0	34	
8-99	0	6	
5-00	0	8	
9-00	0	6	
5-01	0	16	
9-02	0	0	
8-03	0	8	

	E15	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
8-88	0	11
6-89	0	16
6-90	0	11
5-91	0	13
5-92	0	23
8-93	0	4
6-94	0	6
6-95	0	8
6-96	0	10
10-96	0	29
6-97	0	3
10-97	0	14
5-98	0	22
8-98	0	7
5-99	0	38
8-99	0	18
5-00	0	26
9-00	0	14
5-01	0	27
9-02	0	5
8-03	0	5

E3		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	15
6-89	0	15
6-90	1	17
8-91	0	13
5-92	4	21
8-93	0	5
6-94	0	7
6-95	0	8
6-96	0	3
6-97	0	4
5-98	0	3
5-99	0	0
5-00	0	0
5-01	0	16
5-02	0	0
8-03	0	1

	H3	
Sampling Date	Total CPAH <sup>1</sup>	Tol Other
8-88	0	37
6-89	0	93
9-89	0 🐣	37
6-90	0	18
8-90-	0	5,3
	Abandone	ed
	Abandone	d

E7		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
6-96	0	3
10-96	0	5
6-97	0	3
10-97	0	2
5-98	0	1
8-98	0	6
5-99	0	6 5
8-99	0	2
5-00	0	16
9-00	0	9
5-01	0	22
5-02	0	29
8-03	0	22

H6		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	19
6-89	0	16
6-90	0	15
5-91	0	16
5-92	0	16
8-93	0	3
6-94	0	6
6-95	0	3
6-96	0	3
4-97	0	2
5-98	0	5
5-99	0	5
5-00	0	5
5-02	0	0

All concentrations reported in nanograms per liter (ng/l)

MTK6		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	4
6-89	0	12
6-90	5	22
5-91	0	17
5-92	4	19
8-93	0	7
6-94	0	8
6-95	0	15
6-96	0	4
4-97	0	3
5-98	0	0
5-99	0	2
5-00	0	3
5-02	0	0

W48		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	2,418
6-89	0	1,636
9-89	0	1,850
10-89	0	1,130
3-90	0	1,690
6-90	0	1,809
8-90	22	4,566
8-93	2	428
6-94	1	285
6-95	3	310
6-96	3	259
6-97	0	316
10-97	0	290
5-98	0	186
8-98	0	50
5-99	0	226
8-99	0	226
5-00	0	222
9-00	0	130
5-01	0	234
8-01	0	149
11-01	0	180
3-02	0	222
5-02	0	185
9-02	0	138
10-02	0	187
3-03	0	108
5-03	0	135
8-03	0	135
10-03	0	173

	W23	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
9-88	0	111,100
12-88	0	123,100
3-89	0	120,200
6-89	0	117,600
9-89	0	106,300
3-90	0	129,100
8-90	0	114,700
3-91	0	87,800
6-91	0	71,800
9-91	0	91,200
10-91	0	82,600
2-92	0	67,600
9-92	0	78,000
6-94	0	60,000
10-94	0	64,000
5-95	4,000	128,000
9-95	0	70,000
4-96	0	48,000
7-96	0	50,000
4-97	0	34,000
10-97	0	47,000
2-98	0	03
11-98	0	42,090
4-99	0	25,970
8-99	0	14,850
5-00	0	8,790
9-00	0	37,980
12-00	0	25,000
4-01	472	25,840
3-02	0	28,700
6-02	654	29,832
9-03	514	23,391

W119		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	3
6-89	0	18
9-89	0	11
9-01	0	294
Well	was out of	service 02'
10-03	1	196

Age.	W40	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
8-88	0	1,062
6-89	0	540
6-90	16	705
5-91	5	474
5-92	2	283
8-93	- 5	345
6-94	0	484
6-95	0	369
6-96	0	498
4-97	0	624
5-98	0	220
5-99	0	299
5-00	2 -	129
5-01	7	390
	- Well is out	of service

W70		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	481
6-89	5	426
9-89	0	280
6-90	9	560
5-91	8	669
6-92	8	401
8-93	2	317
6-94	4	299
6-95	0	384
6-96	0	342
4-97	0	335
5-98	0	307
5-99	0	254
5-00	0	3
Wel	was out of	service 01-02'
5-03	0	0

W29		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	495
6-89	28	338
6-90	4	372
5-91	6	405
5-92	12	531
8-93	39	1,887
6-94	9	749
6-95	0	1,164
6-96	0	82
4-97	0	418
5-98	0	261
5-99	0	99
5-00	3	212
5-01	3	175
5-02	0	44
5-03	0	62

	W401	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	12
6-89	0	15
6-90	0	27
5-91	0	28
5-92	0	10
8-93	1	10
6-94	0	8
6-95	0	16
6-96	0	19
10-96	0	29
6-97	0	174
10-97	0	121
5-98	0	66
8-98	0	5
5-99	0	64
8-99	0	23
5-00	0	105
9-00	0	158
5-01	0	295
5-02	0	149
8-03	0	60

All concentrations reported in nanograms per liter (ng/l)

W402		
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
9-89	0	151
6-90	47	720
8-90	16	133
5-91	16	408
8-91	0	18,320
6-92	12	895
8-93	7	145
6-94	5	104
6-95	0	567
6-96	13	383
4-97	0	257
5-98	0	349
5-99	1	545
5-00	0	1,287
5-01	0	267
5-02	13	165
5-03	3	56

	W403	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
8-88	0	57
6-89	40	974
9-89	0	177
8-90	49	1,102
5-91	110	976
8-91	0	11,570
6-92	19	816
8-93	7	516
6-94	7	1,271
6-95	0	543
6-96	3	182
4-97	0	172
5-98	0	11
5-99	0	169
5-00	0	195
5-01	0	458
5-02	3	134
5-03	125	66

	W406	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
6-89	0	36
10-89	0	26
6-90	8	43
8-90	-15	119
5-91	2.1	30
8-91	1	40
5-92	6 ,	53
8-93	0	22
6-94	0	31
6-95	. 0	34
6-96	0	21
4-97	0	27
5-98	0	15
5-99	0	.28
5-00	0	30
5-02	well ou	t of service

#### NOTES

<sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1)), consist of the sum of:

benzo(a)anthracene indeno(1,2,3-cd)pyrene

benzo(a)pyrene quinoline\*

benzo(b)flouranthene benzo(j)fluoranthene\*\*
chrysene benzo(g,h,i)pervlene

dibenz(a,h)anthracene

\*Quinoline is included in the sum of CPAH if other CPAHs were detected. If no CPAHs are detected, quinoline is included in the Total Other PAH.

\*\*Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene. Benzo(j)fluoranthene can not be consistantly separated by the laboratory. Therefore if present, it will be reported as benzo(b)- and/or benzo(k)-fluoranthene.

<sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2), consists of the sum of:

acenapthene biphenyl indene acenaphthylene carbazole indole

acridine dibenzofuran 1-methylnaphthalene dibenzothiophene anthracene 2-methylnaphthalene benzo(k)fluoranthene 2,3-dihydroindene naphthalene 2,3-benzofuran fluoranthene perylene benzo(e)pyrene fluorene phenanthrene benzo(b)thiophene pyrene

<sup>&</sup>lt;sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit.



#### 5.0 ST. PETER AQUIFER

Nine St. Peter Aquifer wells were monitored semi-annually in 2003. In addition to water quality monitoring, groundwater elevations were measured in 10 St. Peter Aquifer wells on April 18 and August 1, 2003. Summaries of analytical data and groundwater elevations for the first and second half of 2003 are shown in Figures 5-1 and 5-2 respectively. Laboratory reports of the analytical data are included in the Appendices. The Guide to Appended Laboratory Results for all of 2003 precedes the Appendices.

A historical summary of total Other PAH and carcinogenic PAH results from 1988 through 2003 is presented in Table 5-1. The data in Table 5-1 indicates several trends. Total PAH concentrations have remained relatively stable for wells W122 and W133. Total PAH concentrations show a downward trend in groundwater samples collected from SLP3, W24, W33, W409, W410, W411, and W412. Carcinogenic PAH was detected in five of the nine monitoring wells sampled in 2003.

Groundwater samples collected from well W409 have shown a variation in total PAH concentrations, apparently in response to pumping well W410. The PAH concentration in well W409 increased from 1991 to 1996, decreased for two years, then reached an all-time high in May of 2000. Total PAH concentrations have steadily decreased in well W409 since the May 2000 sample.

The total PAH concentration at well W410 appears to have reached a high near 21 micrograms per liter in 1994/1995 and since then has shown a general downward trend.

In conclusion, the 2003 sampling results for the St. Peter Aquifer appear to accurately represent water quality conditions in the aquifer. The operation of well W410 does appear to be effective in controlling the flow of groundwater as evidenced by the 2003 water quality, and the water level contours shown in Figures 5-1 and 5-2. Continued monitoring in accordance with the Sampling Plan will allow continued evaluation of water quality in the St. Peter Aquifer.

5-1
Historical Sui. of Other PAH and
CPAH Analytical Results
1988 Through 2003

#### St. Peter Aquifer Wells

All concentrations reported in nanograms per liter (ng/l).

	SLP3		
Sampling	Total	Total	
Date	CPAH1	Other PAH <sup>2</sup>	
7-88	0 3	8	
10-88	0	9	
6-89	0	10	
10-89	0	15	
6-90	5	29	
8-90	1	18	
8-91	1	23	
6-92	0	16	
11-92	0	13	
4-93	0	9	
7-93	0	5	
5-94	0	8	
10-94	0	5	
5-95	0	7	
10-95	0	16	
6-96	0	11	
10-96	0	4	
4-97	0	6	
10-97	0	5	
4-98	0	7	
9-98	0	247	
5-99	0	7	
8-99	0	0	
5-00	0	5	
9-00	2	25	
5-01	0	10	
8-01	0	2	
5-02	0	15	
9-02	0	0	
5-03	0	0	
8-03	0	0	

	P116	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH
7-88	8	196
10-88	0	3,770
6-89	1	82
10-89	3	42
8-90	2	20
4-91	0	61
8-91	3	40
6-92	3 13	40 118
11-92	10	219
	4	
4-93		52
7-93	2	38
5-94		64
11-94	0	- 66
5-95	0	50
10-95	0	53
6-96	0	7
10-96	0	43
4-97	0	35
10-97	0	82
4-98	5	148
9-98	0	60
5-99	4	50
8-99	0	55
5-00	2	36

Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH
7-88	57	95
10-88	0 =	439

W24			
Sampling	Total	Total	
Date	CPAH1	Other PAH <sup>2</sup>	
7-88	0	3,309	
10-88	0	3,622	
4-91	0	4,023	
8-91	0	4,160	
6-92	0	3,380	
11-92	0	3,650	
4-93	0	2,950	
7-93	0	3,294	
5-94	0	2,669	
11-94	0	4,029	
5-95	0	3,190	
10-95	0	1,550	
5-96	0	974	
10-96	0	1,603	
4-97	0	1,513	
10-97	0	1,340	
4-98	0	689	
9-98	0	1,120	
4-99	0	2,085	
9-99	0	3,590	
5-00	0	940	
5-01	0	152	
9-01	0	619	
6-02	0	439	
9-02	0	307	
6-03	0	335	
9-03	0	246	



### **LEGEND**



**Reilly Site** 



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppt)
Total Carcinogenic PAH (ppt)
Total Other PAH (ppt)
0 = Not detected
- = Not sampled

2 Foot Groundwater Level Contour



### FIGURE 5-2

Summary of Groundwater Monitoring Results St. Peter Aquifer Second Half, 2003

DRAWN: A. DESILETS	DATE: 2/23/2004	REV:
CHECKED: B. GREGG	PROJECT: 1620-032	1



NON-RESPONSIVE

### **LEGEND**



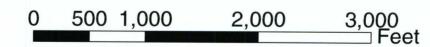
Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppt)
Total Carcinogenic PAH (ppt)
Total Other PAH (ppt)
0 = Not detected

- = Not sampled

2 Foot Groundwater Level Contour



### FIGURE 5-1

Summary of Groundwater Monitoring Results St. Peter Aquifer First Half, 2003

DRAWN: A. DESILETS	DATE: 2/23/2004	REV:
CHECKED: B. GREGG	PROJECT:	1



5-1
Historical Successful of Other PAH and CPAH Analytical Results 1988 Through 2003

#### St. Peter Aquifer Wells

All concentrations reported in nanograms per liter (ng/l).

W33		
Sampling	Total	Total
Date	CPAH1	Other PAH <sup>2</sup>
7-88	0	16,430
10-88	0	12,455
8-90	0	290
4-91	0	17,912
8-91	0	9,921
6-92	0	3,448
11-92	14	3,304
4-93	0	1,334
7-93	0	1,000
5-94	8	968
11-94	0	1,700
5-95	0	1,901
10-95	0	1,062
5-96	0	566
10-96	0	655
4-97	0	651
10-97	0	1,779
4-98	0	2,516
9-98	0	4,792
4-99	2	2,383
9-99	0	1,355
5-00	235	1,139
9-00	1	925
5-01	0	1,411
9-01	6	698
6-02	0	80
9-02	1	54
6-03	66	115
9-03	35	175

	W122	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>
7-88	21	142
10-88	0	2,246
6-89	20	965
10-89	15	114
4-91	36	757
8-91	10	853
6-92	43	568
11-92	7	179
4-93	32	308
7-93	24	330
5-94	23	583
10-94	10	374
5-95	0	281
10-95	11	220
6-96	0	144
10-96	0	235
4-97	0	256
10-97	0	243
4-98	7	370
9-98	0	99
5-99	0	71
8-99	7	46
5-00	39	65
9-00	6	142
5-01	0	92
8-01	0	24
5-02	0	92
9-02	5	73
5-03	29	73
8-03	6	134

	W129	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>
7-88	0	88
10-88	0	290
6-89	0	27
10-89	0	43
6-90	0 -	143
8-90	0	96
4-91	27	159
8-91	0	430
6-92	47	247
11-92	5	296
4-93	15	121
7-93	2	53
5-94	0	171
11-94	2	110=
5-95	12	94
10-95	0	55
6-96	0	53
10-96	0	75
4-97	0	104
10-97	0	181
4-98	9	88
9-98	0	8
5-99	1 1 1	79
8-99	0	80
5-00	26	223
0.00	я	460

W133 Sampling Total Total				
7-88	0	52,370		
10-88	0	29,830		
6-89	0	37,870		
10-89	0	21,099		
6-90	0	19,448		
8-90	0	14,030		
4-91	5	2,587		
8-91	0	4,610		
6-92	0	2,453		
11-92	0	1,920		
4-93	0	1,134		
7-93	0	836		
5-94	5	665		
10-94	0	434		
5-95	0	165		
10-95	0	157		
5-96	0	142		
10-96	0	285		
4-97	0	241		
10-97	0	108		
4-98	0	88		
9-98	0	299		
4-99	7	633		
9-99	0	190		
5-00	0	167		
9-00	0	327		
5-01	0	156		
8-01	0	40		
5-02	0	904		
9-02	0	338		
5-03	6	114		
8-03	11	338		

5-1
Historical Su of Other PAH and
CPAH Analytical Results
1988 Through 2003

#### St. Peter Aquifer Wells

All concentrations reported in nanograms per liter (ng/l).

	W408	
Sampling	Total	Total
Date	CPAH <sup>1</sup>	Other PAH
7-88	2	151
10-88	0	34
6-89	5	145
10-89	0	110
6-90	0	24
8-90	28	130
4-91	13	343
8-91	25	1,163
6-92	32	283
11-92	2	172
4-93	4	150
7-93	6	217
5-94	5	70
11-94	0	170
5-95	9	143
10-95	15	135
6-96	0	66
10-96	0	103
4-97	0	169
10-97	0	166
4-98	1	96
9-98	0	62
5-99	0	64
8-99	2	51
5-00	89	103
9-00	0	53

	W409	
Sampling	Total	Total
Date	CPAH1	Other PAH <sup>2</sup>
7-88	159	2,198
10-88	0	890
6-89	53	571
10-89	0	830
6-90	0	141
8-90	43	200
4-91	0	360
8-91	0	3,833
6-92	0	49,660
11-92	0	49,399
4-93	0	50,060
7-93	0	42,440
5-95	0	173,000
10-95	0	167,000
4-96	0	805,420
10-96	0	312,500
5-97	0	157,000
9-97	0	64,000
5-98	0	159,200
9-98	0	107,700
4-99	0	446,860
8-99	0	342,000
5-00	0	1,196,900
9-00	620	468,710
5-01	0	269,800
8-01	0	228,300
5-02	0	324,300
9-02	0	135,200
5-03	0	170,600
8-03	0	213,700

W410				
Sampling	Total	Total		
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>		
7-88	0	1,288		
10-88	0	1,435		
6-89	5	424		
10-89	0	357		
4-91	0	85		
8-91	0	5,330		
2-92	0	14,070		
6-92	0	12,850		
11-92	0	16,470		
4-93	0	17,600		
7-93	0	16,609		
5-94	0	14,505		
10-94	0	20,880		
5-95	0	21,640		
10-95	0	13,940		
5-96	0	15,970		
10-96	0	14,170		
4-97	0	14,690		
10-97	0	10,150		
4-98	0	8,620		
5-98	0	1,900		
9-98	0	9,690		
11-98	0	5,942		
3-99	0	8,780		
4-99	0	21,606		
9-99	0	8,780		
11-99	0	3,800		
2-00	0	4,750		
5-00	0	6,502		
9-00	0	6,269		
12-00	0	1,500		
3-01	0	2,940		
5-01	0	6,217		
9-01	0	2,854		
3-02	0	2,090		
6-02	0	2,142		
9-02	0	3,327		
6-03	0	4,593		
9-03	0	4,332		

		W411	
	Sampling	Total	Total
	Date	CPAH1	Other PAH <sup>2</sup>
Ī	7-88	0	1,274
	10-88	0	1,161
	6-89	8	200
	10-89	0	460
	6-90	15	451
	8-90	0	336
	4-91	12	384
	8-91	0	251
	6-92	24	313
	11-92	1	181
	4-93	7	189
	7-93	5	113
	5-94	3	120
	11-94	6	219
	5-95	6	235
	10-95	1	183
	6-96	0	79
	10-96	0	253
	4-97	0	82
	10-97	3	253
	4-98	1	120
	9-98	61	424
	5-99	0	99
	8-99	0	79
	5-00	0	56
	9-00	17	138
	5-01	0	124
	8-01	0	46
	5-02	0	34
	9-02	0	16
	5-03	38	113
	8-03	0	57

# Historical Su of Other PAH and CPAH Arrenytical Results 1988 Through 2003

#### St. Peter Aquifer Wells

All concentrations reported in nanograms per liter (ng/l).

W412				
Sampling	Total	Total		
Date	CPAH1	Other PAH		
7-88	8	1,309		
10-88	0	209		
6-89	18	211		
10-89	0	132		
8-90	1	484		
4-91	48	1,470		
8-91	0	5,283		
6-92	12	1,319		
11-92	0	3,796		
4-93	154	842		
7-93	16	777		
5-94	25	291		
10-94	10	538		
5-95	18	369		
10-95	0	402		
5-96	0	139		
10-96	0	1,620		
4-97	0	806		
10-97	0	614		
4-98	30	260		
9-98	60	557		
4-99	20	267		
9-99	0	764		
5-00	250	105		
9-00	1	164		
5-01	4	363		
8-01	0	1125		
5-02	10	243		
9-02	3	135		
5-03	12	82		
8-03	15	130		

#### NOTES:

<sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1)), consist of the sum of:

benzo(a) anthracene	indeno(1,2,3-cd)pyrene
benzo(a)pyrene	quinoline*
benzo(b)flouranthene	benzo(j)fluoranthene**
chrysene	benzo(g,h,i)perylene
dibenz(a,h)anthracene	

\*Quinoline is included in the sum of CPAH if other CPAHs were detected.

If no CPAHs are detected, quinoline is included with the Total Other PAH.

\*\*Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene
or benzo(k)fluoranthene. Benzo(j)fluoranthene can not be consistantly
separated by the laboratory. Therefore if present, it will be reported as
benzo(b)- and/or benzo(k)-fluoranthene.

<sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2), consists of the sum of:

acenapthene	2,3-dihydroindene	
acenaphthylene	fluoranthene	
acridine	fluorene	
anthracene	indene	
benzo(k)fluoranthene	indole	
2,3-benzofuran	1-methylnaphthalen	
benzo(e)pyrene	2-methylnaphthalene	
benzo(b)thiophene	naphthalene	
biphenyl	perylene	
carbazole	phenanthrene	
dibenzofuran	pyrene	

<sup>&</sup>lt;sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit.



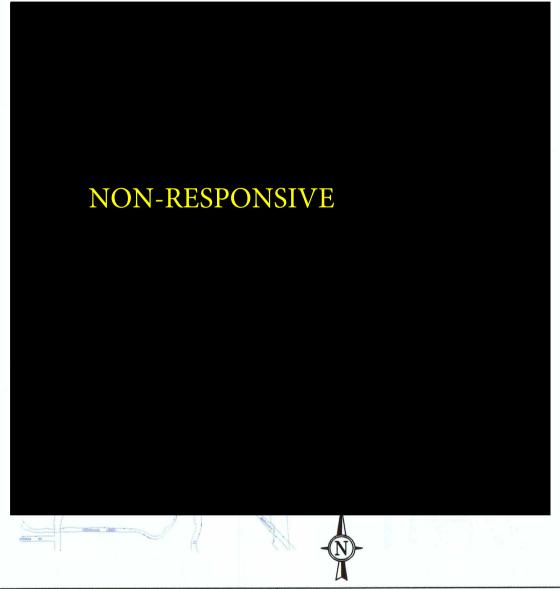
### 6.0 DRIFT-PLATTEVILLE AQUIFER SOURCE AND GRADIENT CONTROL WELLS

Groundwater monitoring for the Drift and Platteville Aquifers in 2003 included quarterly PAH monitoring of wells W420 and W439, the active Drift Aquifer source and gradient control wells, and W421 and W434, the Platteville Aquifer source and gradient control wells. Wells W420 and W421 have been monitored quarterly since they began pumping in 1987. This is the ninth year of quarterly monitoring for well W439 since pumping began in early 1995 and the seventh year of quarterly monitoring for well W434 since the pump was activated in June 1997. Average pumping rates for wells W420, W421, W434, and W439 were 33, 23, 26, and 44 gpm, respectively. The monitoring data are presented on Figures 6-1, 6-2, 6-3, and 6-4. The laboratory reports of the analytical data are included in the Appendices. Please refer to the Guide to Appended Laboratory Results for 2003 that precedes the Appendices to locate the individual sample results.

Other PAH, carcinogenic PAH and phenolic data for wells W420, W421, W434, and W439 are summarized in Table 6-1. The trends of these data suggest a gradual decreasing trend in total PAH concentrations in wells W434 and W439 since pumping started in each well. The 2003 total Other PAH concentrations in well W420 averaged approximately 3,400 ug/l in 2003 and indicate a stable PAH concentration. No carcinogenic PAH have ever been detected in well W420. The 2003 total Other PAH concentrations in well W421 averaged approximately 2,000 ug/l and well W439 averaged 1,200 ug/l. Total Other PAH concentrations in well W434 averaged approximately 4 ug/l in 2003. Carcinogenic PAH was detected in W421 at an average concentration of 365 ug/l in 2003.

The evaluation of the effectiveness of each source and gradient control well is provided in Section 7.0 and 8.0 of this report.

Former Drift Aquifer gradient control well W422 continues to be monitored, but is no longer used for pumping. Well W422 was inactivated in October 2000 in accordance with the Agencies' approval letter dated October 3, 2000, because it was no longer needed to control the spread of PAH in the Drift Aquifer. The total Other PAH concentrations in well W422 continued to decrease during 2003.





REILLY SITE

W420 0 0 3,558

WELL LOCATION
WELL IDENTIFICATION
WATER LEVEL
SUM-BENZO(a)PYRENE & DIBENZ(a,h)ANTHRACENE (PPB)
SUM-CARCINOGENIC PAH (PPB)
SUM-OTHER PAH'S (PPB)
TOTAL PHENOLICS (PPB)

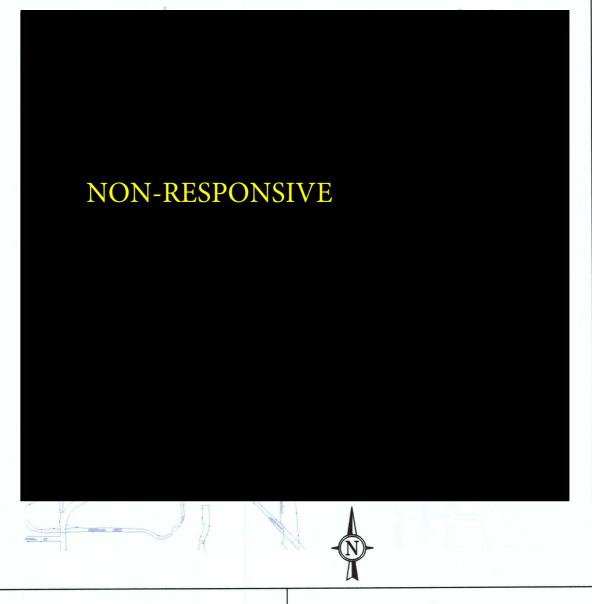
Concentration in micrograms per liter equivalent to parts per billion



SUMMARY OF GROUND WATER MONITORING RESULTS FOR DRIFT-PLATTVILLE AQUIFER MARCH 2003 FIRST QUARTER

DRAWN:	A. TARARA	DATE:	2/27/04	
CHECKED:	WMG	PROJECT:	01620-032	







REILLY SITE



WELL LOCATION
WELL IDENTIFICATION
WATER LEVEL
SUM—BENZO(a)PYRENE & DIBENZ(a,h)ANTHRACENE (PPB)
SUM—CARCINOGENIC PAH (PPB)
SUM—OTHER PAH'S (PPB)
TOTAL PHENOLICS (PPB)

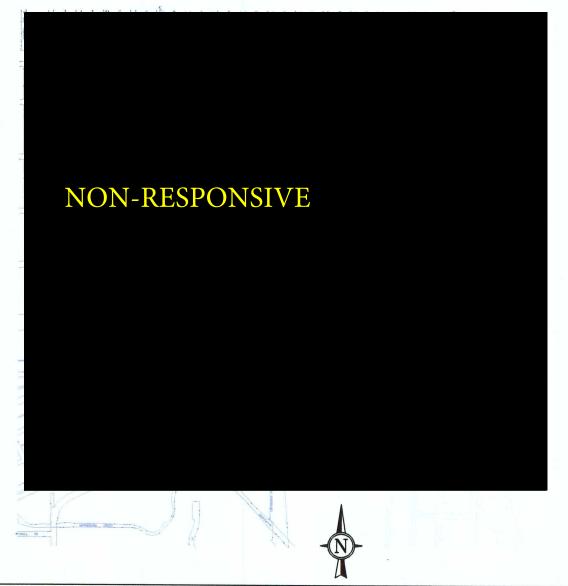
Concentration in micrograms per liter equivalent to parts per billion

FIGURE 6-2

SUMMARY OF GROUND WATER MONITORING RESULTS FOR DRIFT-PLATTVILLE AQUIFER MAY 2003 SECOND QUARTER

DRAWN:	A. TARARA	DATE:	2/27/04	REV:
CHECKED:	WMG	PROJECT:	01620-032	







REILLY SITE



WELL LOCATION
WELL IDENTIFICATION
WATER LEVEL
SUM-BENZO(a)PYRENE & DIBENZ(q,h)ANTHRACENE (PPB)
SUM-CARCINOGENIC PAH (PPB)
SUM-OTHER PAH'S (PPB)
TOTAL PHENOLICS (PPB)

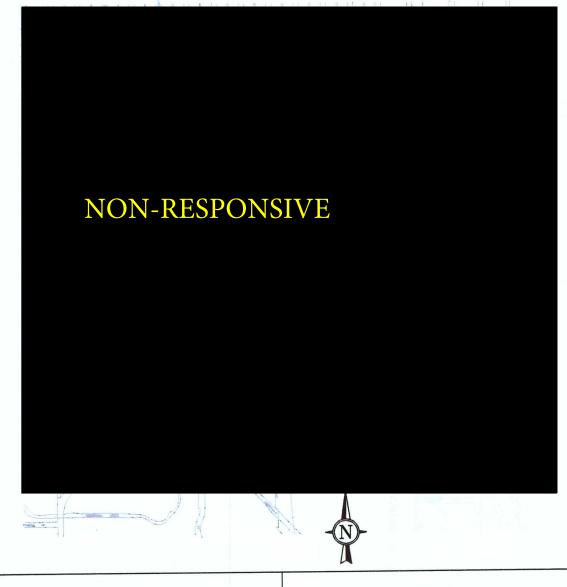
Concentration in micrograms per liter equivalent to parts per billion

## FIGURE 6-3

SUMMARY OF GROUND WATER MONITORING RESULTS FOR DRIFT-PLATTVILLE AQUIFER AUGUST 2003 THIRD QUARTER

DRAWN:	A. TARARA	DATE:	2/27/04	REV:	-
CHECKED:	WMG	PROJECT:	01620-032		.39







REILLY SITE



WELL LOCATION
WELL IDENTIFICATION
WATER LEVEL
SUM—BENZO(a)PYRENE & DIBENZ(a,h)ANTHRACENE (PPB)
SUM—CARCINOGENIC PAH (PPB)
SUM—OTHER PAH'S (PPB)
TOTAL PHENOLICS (PPB)

Concentration in micrograms per liter equivalent to parts per billion



SUMMARY OF GROUND WATER MONITORING RESULTS FOR DRIFT-PLATTVILLE AQUIFER NOVEMBER 2003
FOURTH QUARTER

DRAWN:	A. TARARA	DATE:	2/27/04	REV:	
CHECKED:	WMG	PROJECT:	01620-032		.X



#### Table 6-1

#### Historical Summary of Other PAH and CPAH and Phenolics Wells W420, W421, W422, W434 and W439 1988 Through 2003

All concentrations in micrograms per liter (ug/l)

	W420			1	W421				
	Sampling	Total	Total	Total	ĺ	Sampling	Total	Total	Total
	Date	CPAH1	Other PAH <sup>2</sup>			Date	CPAH	Other PAH <sup>2</sup>	Phenolics
	1st Quarter	03	3,242	440	1	1st Quarter	0	566	33
	2nd Quarter	Ö	3,420	330		2nd Quarter	Ö	821	0
	8-88	ŏ	2,477	220		8-88	Ö	764	30
	10-88	ő	1,148	44		10-88	Ö	1,107	36
	3-89	ő	2,400	120		3-89	Ö	878	29
	6-89	Ö	3,400	129	ì	6-89	Ö	1,000	26
	9-89	ő	3,400	220	ı	9-89	Ö	1,000	33
	12-89	Ō	3,400	110		12-89	ŏ	730	27
	3-90	0	3,950	239		3-90	0	1,420	33
- 1	5-90	0	2,430	231		5-90	0	715	29
	8-90	0	3,150	244		8-90	0	1,410	36
	12-90	0	3,030	228		12-90	0	1,145	29
	3-91	0	4,200	232	ŀ.	3-91	0	1,449	30
	6-91	0	2,494	221	١.,	6-91	10	1,389	31
i	9-91	. 0	4,967	210		9-91	0	1,226	27
	10-91 2-92	0	4,163	194 177		10-91 2-92	0	1,285	30
	2-92 6-92	0	1,526 3,229	204		2-92 6-92	0	988 1,163	31 26
	9-92 9-92	Ö	2,281	167	l	9-92	0	1,163	26 28
	10-92	ő	2,374	236		10-92	Ö	1,299	45
1	3-93	ŏ	4,337	18	1	3-93	Ö	1,332	15
	4-93	0	2,929	207		4-93	ō	1,184	21
	8-93	0	1,825	136		8-93	0	1,025	32
	11-93	0	2,052	148	1	11-93	0	1,017	29
i	2- <del>9</del> 4	0	2,033	109		2-94	0	1,045	14
	6-94	0	2,181	151	1	6-94	0	939	17
	8-94	0	2,026	147		8-94	0	788	31
	10-94	0	2,082	161	ľ	10-94	0	966	24
	3-95	0	2,431	143		3-95	0	949	31
	5-95	0	1,873	134 91		5-95	0	911	19
	9-95 10-95	0	2,523 2,332	113		9-95 10-95	0	968 764	29 20
	2-96	0	1,968	121		2-96	0	618	20 28
	4-96	0	2,165	130		4-96	ő	630	123
- 1	7-96	Ö	2,725	87		7-96	0	884	24
	10-96	ō	2,164	118		10-96	ŏ	843	24
	2-97	Ō	2,324	122	i	2-97	ō	709	26
	5-97	0	3,343	134		5-97	0	741	27
1	9-97	0	2,151	261		9-97	0	699	25
	1-98	0	2,483	140		1-98	0	<b>78</b> 7	26
	2-98	0	2,938	124		2-98	0	915	20
-	5-98	0	2,933	160		5-98	0	684	21
	9-98	0	3,144	80		9-98	0	306	5
	11-98 3-99	0	2,570 3,314	180 200		11-98 3-99	0	518 393	26
	4-99	0	3,414	170		4-99	0	593 611	21 21
	8-99	Ö	2,425	140		8-99	0	389	25
- 1	11-99	Ö	2,345	170		11-99	Ö	479	12
- 1	2-00	ŏ	2,312	150		2-00	ŏ	462	23
	5-00	Ó	4,441	190		5-00	ō	626	24
-	9-00	0	3,070	110		9-00	44	1,022	19
	12-00	0	2,500	90		12-00	0	376	18
	3-01	0	3,680	110		3-01	8	341	21
	5-01	0	6,956	300		5-01	7	717	29
	8-01	0	2,535	140		8-01	31	415	23
	10-01	0	3,608	190		10-01	36	266	27
	3-02 5-02	0	8,578	110 NA		3-02	6	557	7
	9-02	0	4,163 3,981	NA NA		5-02 9-02	3 0	410 551	NA
	10-02	0	3,456	NA NA		10-02	5	551 530	NA NA
	3-03	0	3,558	NA NA		3-03	430	1,302	NA NA
	5-03	0	4,122	NA NA		5-03	310	2,112	NA NA
ļ	8-03	0	3,148	NA		8-03	5	545	NA NA
- [	11-03	Ö	2,835	NA		11-03	715	4,396	NA
								.,500	. •••

Table 6-1

#### Historical Summary of Other PAH and **CPAH and Phenolics** Wells W420, W421, W422, W434 and W439 1988 Through 2003

All concentrations in micrograms per liter (ug/l)

ſ	W434					
Sampling	Total	Total	Total			
Date	CPAH1	Other PAH <sup>2</sup>	Phenolics			
2-92	0	4	9			
10-96	0	4	NA			
4-97	0	7	NA			
9-974	0	5	8			
10-97	0	3	NA			
1-98	0	4	0			
2-98	0	3	5			
5-98	0	3	5			
9-98	0	73	0			
11-98	0	12	0			
3-99	0	14	0			
4-99	0	1	0			
8-99	0	1	6			
11-99	0	1	0			
2-00	0	2	0			
5-00	0	5	3			
9-00	0.27	4	0			
12-00	0	1	0			
3-01	0	3	5			
5-01	0	6	6			
9-01	0	4	NA			
10-01	0	4	5			
3-02	0	5	25			
5-02	0	5	NA			
9-02	0	5	NA			
5-03	0	4	NA			
8-03	0	3	NA NA			

W439					
Sampling	Total	Total	Total		
Date	CPAH1	Other PAH <sup>2</sup>	Phenolics		
3-95	0	3,933	91		
5-95	0	4,053	74		
9-95	0	2,584	54		
10-95	0	2,115	50		
2-96	0	1,552	46		
4-96	0	1,419	43		
7-96	0	1,765	43		
10-96	0	1,557	45		
2-97	0	1,277	43		
5-97	0	1,683	48		
9-97	0	1,547	42		
1-98	0	1,236	34		
2-98	0	1,377	31		
5-98	0	1,221	35		
9-98	0	978	12		
11-98	0	954	53		
3-99	0	1,385	29		
4-99	0	1,278	31		
8-99	0	765	45		
11-99	ø	1,123	17		
2-00	0	1,081	31		
5-00	0	1,975	31		
9-00	0	1,859	26		
12-00	0	1,187	37		
3-01	0	1,498	34		
5-01	0	1,623	37		
8-01	٥	1,056	NA		
10-01	0	1,095	42		
3-02	0	1,205	27		
5-02	0	1,214	NA		
9-02	0	1,027	NA		
5-03	0	981	NA		
8-03	0	1,535	NA NA		

<sup>&</sup>lt;sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1)), consist of the sum of:

benzo(a) anthracene

chrysene

quinoline\*

benzo(a)pyrene dibenz(a,h)anthracene benzo(b)flouranthene indeno(1,2,3-cd)pyrene benzo(j)fluoranthene\*\*

benzo(b)flouranthene Indeno(1,2,3-cd)pyrene benzo(g,h,i)perylene
\*Quinoline is included in the sum of CPAH if other CPAHs were detected. If no CPAHs are detected, quinoline is included in the Total Other PAH.

\*\*Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene. Benzo(j)flouranthene can not be consistently separated by the laboratory. Therefore, if present, it will be reported as benzo(b)- and/or benzo(k)-fluoranthene.

acenapthene acenaphthylene acridine anthracene benzo(k)fluoranthene benzo(e)pyrene benzo(b)thlophene biphenyi carbazole dibenzothiophene

2,3-dihydroindene fluoranthene fluorene indene indole

1-methylnaphthalene 2-methylnaphthalene naphthalene perylene phenanthrene pyrene

2.3-benzofuran

NA = Not analyzed for Identified compound class.

<sup>&</sup>lt;sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2), consists of the sum of:

<sup>&</sup>lt;sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit.

<sup>&</sup>lt;sup>4</sup> Pump was activated in W434 in June of 1997



#### 7.0 PLATTEVILLE AQUIFER

In accordance with the 2003 Sampling Plan, 11 Platteville Aquifer monitoring wells were sampled twice in 2003. In addition to water quality monitoring, groundwater elevations were measured in 22 Platteville Aquifer wells on April 18, and August 1, 2003. Summaries of analytical data and groundwater elevations for the first and second half of 2003 are shown in Figures 7-1 and 7-2 respectively. Laboratory reports of the analytical data are included in the Appendices. The Guide to Appended Laboratory Results for all of 2003 precedes the Appendices.

Table 7-1 is a historical summary since 1988 of Other PAH, carcinogenic PAH and phenolic data for Platteville Aquifer wells. The analytical results for all Platteville Aquifer wells are reported in micrograms per liter (ug/l), or parts per billion. The historical water quality data shown in Table 7-1 indicates a stable or decreasing trend in PAH concentrations in most Platteville Aquifer wells. The 2003 water quality data for the Platteville Aquifer indicates little change in the overall distribution of PAH compared to prior years.

The water level contours in Figures 7-1 and 7-2 illustrate the influence of the Platteville Aquifer source control wells on the regional east-southeast groundwater flow direction. Well W421 is currently being pumped at a rate of approximately 23 gpm, in accordance with the CD-RAP, and appears to be effective in controlling groundwater in an area at least the size of the bog between Walker and Lake Streets.

Figures 7-1 and 7-2 show that pumping well W434 has little effect on the Platteville Aquifer. Well W434 pumped at approximately 26 gpm in 2003. It appears that the well has a local effect in controlling groundwater in the Platteville Aquifer in the immediate area, however, due to the low transmissivity of the Platteville Aquifer in this area, the capture zone is limited. The capture zone of W434 is likely affected by leakage above from the Drift Aquifer recharging the Platteville Aquifer and this effect decreases the lateral extent of the capture area of W434.

Concentrations of PAH were detected in five of the 11 Platteville Aquifer monitoring wells sampled. The highest concentration was 5,977 ug/l detected in well W437. Carcinogenic PAH concentrations were not detected in any of the 11 wells sampled.





### **LEGEND**



Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppb)
Total Carcinogenic PAH (ppb)
Total Other PAH (ppb)
0 = Not detected
- = Not sampled

2 Foot Groundwater Level Contour

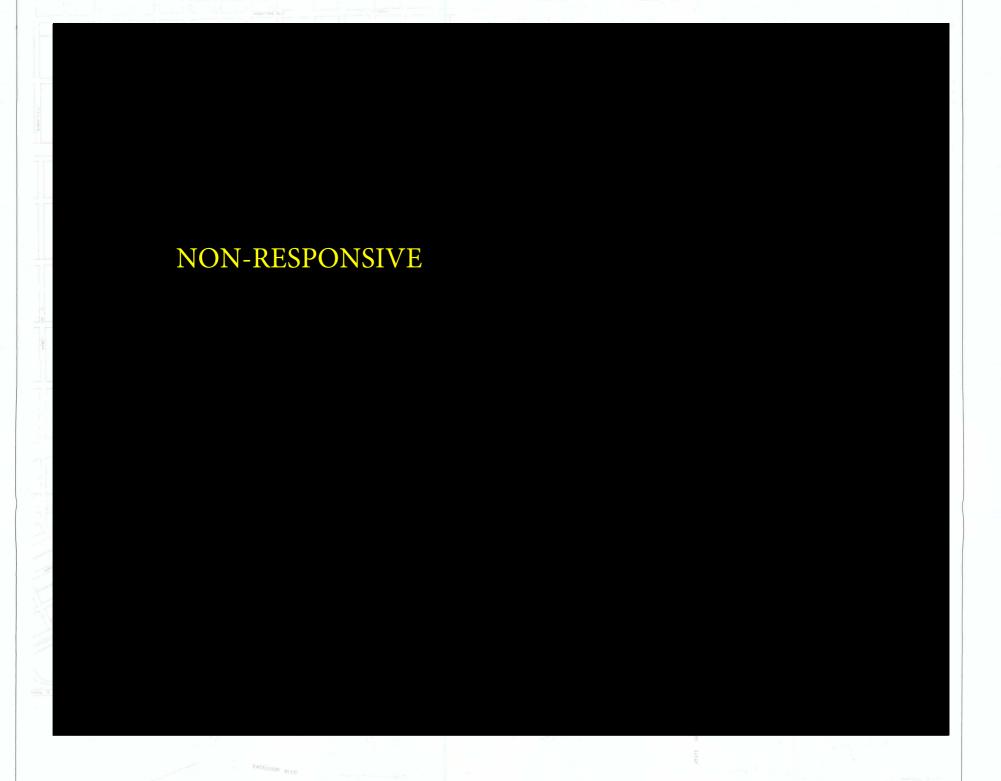


## FIGURE 7-2

Summary of Groundwater Monitoring Results Platteville Aquifer Second Half, 2003

DRAWN:	DATE:	REV:
A. DESILETS	2/23/2004	•
CHECKED: B. GREGG	PROJECT:	1
B. GREGG	1620-032	





MEADOWBROOK GOLF

### **LEGEND**



Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppb)
Total Carcinogenic PAH (ppb)
Total Other PAH (ppb)
0 = Not detected
- = Not sampled



2 Foot Groundwater Level Contour

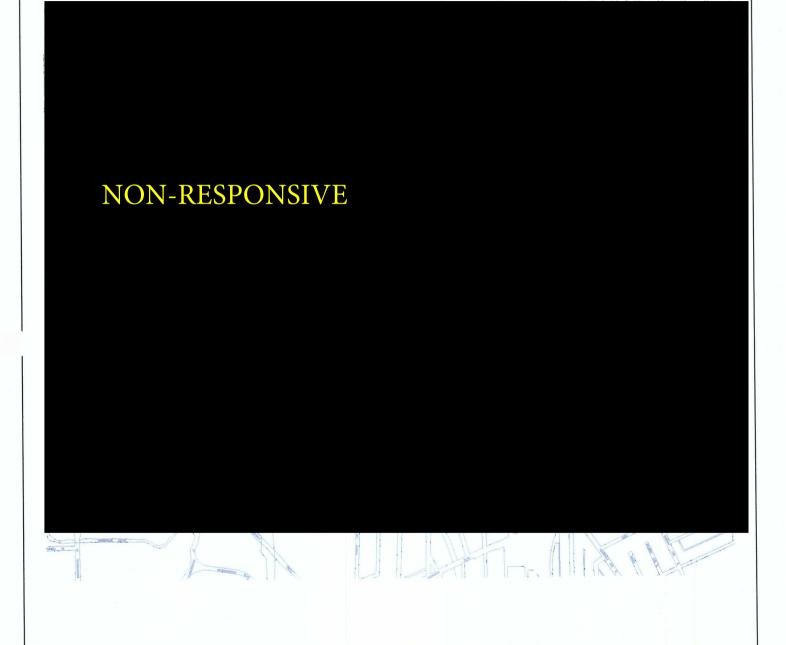


### FIGURE 7-1

Summary of Groundwater Monitoring Results Platteville Aquifer First Half, 2003

DRAWN: A. DESILETS	DATE: REV: 2/23/2004	
CHECKED: B. GREGG	PROJECT: 1620-032	1







INFERRED AREA



WELL LOCATION WELL IDENTIFICATION

# FIGURE 7-3

INFERRED AREA WHERE GROUNDWATER IN THE PLATTEVILLE AQUIFER EXCEEDS DRINKING WATER CRITERIA, 2003

DRAWN: A. TARARA DATE: 2/27/04 PROJECT No.:

FILE No.: FIG 7-3.dwg CHECKED: WMG



#### Table 7-1

Historical Summ

ther PAH, CPAH, and ical Results

Phenoli

1988 . Jugh 2003

### Platteville Aquifer Wells

PAH concentrations in micrograms per liter (ug/l) Phenolic concentrations in micrograms per liter (ug/l)

	L. Carrie	N18	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
8-88	0.3	0	20
10-88	-0-	361	20
6-89	0	39	44
2-92	0	10	8
5-96	0	2	NA
9-96	0	2	NA-
4-97	0	1	NA
9-97	0	1 9	NA
5-98	0	1	NA
9-98	0	0	NA-
5-99	0	1	NA
9-99	0	1	NA
5-00	0	1	NA
9-00	0	1	NA

W27				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
10-88	0	1,882	NA	
6-89	0	1,345	NA	
5-96	0	1	NA	
10-96	0	9	NA	
4-97	0	281	NA	
9-97	0	416	NA	
4-98	0	184	NA	
9-98	0	422	NA	
4-99	0	312	NA	
8-99	0	158	NA	
5-00	0	415	NA	
9-00	0	243	NA	
5-01	0	199	NA	
8-014	0	99	NA	
5-02	0	123	NA	
9-02	0	193	NA	
5-03	0	89	NA	
8-03	0	85	NA	

	- 1	N19	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolic
8-88	0	0	0
10-88	0	0	35
6-89	0	. 0	26
2-92	0.	0	0
5-94	0 "	0	0
5-96	. 0	0	NA
9-96	0 -	0	NA
4-97	0	0	NA
9-97	0	0	NA.
5-98	0	0	NA
9-98	0	0	NA
5-99	0	0	NA 1
9-99	0	-0	NA
5-00	0	0	NA -
9-00	0	0	NA .

Sampling	Total	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>	Phenolics

		W22	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
5-90	0	. 0	- 0
2-92	0	1	0
3-92	0	5	NA NA
5-96	0	0	NA:
9-96	0	0)	-NA
4-97	0	2	NA
9-97	0	2-	NA NA
4-98	- 0.	1	NA
9-98	0	8.	NA .
4-99	0	122	- NA
9-99	0	24	NA NA
5-00	0	3.	NA
9-00	0	42	- NA

	W20					
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics			
8-88	0	0	28			
10-88	0	3	16			
6-89	0	6	34			
5-90	0	7	9			
5-94	0	1	0			
5-96	0	1	NA			
9-96	0	1	NA			
4-97	0	2	NA			
10-97	0	2	NA			
5-98	0	1	NA			
9-98	0	0	NA			
5-99	0	1	NA			
9-99	0	1	NA			
5-00	0	1	NA			
9-00	0	1	NA			
5-01	0	0	NA			
8-014	0	0	NA			
5-02	0	0	NA			
9-02	0	0	NA			
5-03	0	6	NA			
8-03	0	5	NA			

#### Table 7-1

Historical Summ

ther PAH, CPAH, and ical Results

Phenoli ical Res 1986 agh 2003

### Platteville Aquifer Wells

PAH concentrations in micrograms per liter (ug/l) Phenolic concentrations in micrograms per liter (ug/l)

		W1	-7
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
8-88	0	0	0
10-88	0	1	96
6-89	0	0	34
5-94	0	1	0
5-96	0	1	NA
9-96	0	0	NA
4-97	0	0	NA
9-97	0	1.	NA
5-98	0	0	NA
9-98	0	0	NA
5-99	0	0	NA
9-99	0	0	NA :
5-00	0	0	NA
9-00	0	0	NA

		/121	
Sampling	Total	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>	Phenolics
8-88	0	0	.73
10-88	0	0	35
6-89	0 1	0	35
5-90	0	0	0
5-94	0	0.	0
5-96	0	0	NA
10-96	0	0	NA
4-97	0	0	NA
10-97	0	0	NA
5-98	0	0	NA
9-98	0	0	NA
5-99	0	0	NA
9-99	0	0	NA
5-00	0	0	- NA
9-00	0	0	NA

	-W1	24	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
8-88	0-	0 -	0
10-88	0	0 0	0
6-89	0.5	0	0
5-90	0	. 420	0
5-94	0.	0	0
6-96	0	0	NA
9-96	0	. 0	NA
4-97	0 -	0	NA :
10-97	0	0	NA .
5-98	0	0	NA
9-98	0	0	NA
5-99	0	0	NA :
9-99	0	0	NA
5-00	0	- 0	NA .
9-00	0	0	NA -

	\	V101	
Sampling	Total	Total	Total
Date	CPAH1	Other PAH <sup>2</sup>	Phenolics
8-88	0	4	7
10-88	0	23	0
6-89	0	48	20
5-90	0	22	0
2-92	0	18	6
5-94	0	11	0
5-96	0	5	NA
10-96	0	32	NA
4-97	0	31	NA
9-97	0	15	NA
4-98	0	17	NA
9-98	0	125	NA
4-99	0	32	NA
9-99	0	24	NA
5-00	0	41	NA
9-00	0	32	NA
4-01	0	18	NA
9-014	0	12	NA
5-02	0	17	NA
9-02	0	6	NA
5-03	0	14	NA
8-03	0	3	NA

W130				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
8-88	0	0.1-	0	
10-88	0	0	0	
6-89	0	0	0	
5-90	0	0.34-36	. 0	
5-96	0	- 0	NA	
10-96	0	0	NA	
4-97	0	0	NA	
10-97	0	0	NA	
5-98	0	0	NA	
9-98	0-	0	NA	
5-99	0	0-	NA	
9-99	0	0	NA NA	
5-00	0	. 0	NA	
9-00	0	0	NA	

	W1	31	
Sampling	Total	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>	Phenolics
8-88	0	0	0
10-88	0	0	13
6-89	0	0	0
2-92	0	13	0
5-94	0	0	0
5-96	0	0	NA
10-96	0	0	NA
4-97	0	0	NA
10-97	0	0	NA
5-98	0	0	NA
9-98	0	0	NA
5-99	0	0	NA
9-99	0	0	NA
5-00	0	0	NA
5-01	0	0	NA
8-01⁴	0	0	NA
5-02	0	0	NA
9-02	0	0	NA
5-03	0	0	NA
8-03	0	0	NA

# Table 7-1 Historical Summar of Other PAH, CPAH, and Phenolic 1988 Through 2003

### Platteville Aquifer Wells

PAH concentrations in micrograms per liter (ug/l)
Phenolic concentrations in micrograms per liter (ug/l)

W143				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
8-88	0	0	0	
10-88	0	0	0	
6-89	0	1	33	
5-96	0	1	NA	
10-96	0	1	NA	
4-97	0	9	NA	
9-97	0	1	NA	
4-98	0	4	NA	
9-98	0	10	NA	
4-99	0	15	NA	
9-99	0	4	NA	
5-00	0	0	NA	
5-01	0	5	NA	
9-014	0	3	NA	
5-02	0	10	NA	
9-02	0	0	NA	
5-03	0	0	NA	
8-03	0	0	NA	

	V	/426	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
8-88	1	905	25
10-88	0	639	35
6-89	0	498	80
2-92	0	82	15
3-92	0	47	NA
5-96	0	55	NA
4-97	0	76	NA
9-97	0	64	NA
4-98	0	108	NA
9-98	0	1,508	NA
4-99	0	642	NA
8-99	0	258	NA
5-00	0	112	NA
9-00	0	160	NA
5-01	0	131	NA
8-014	0	32	NA
5-02	0	564	NA
9-02	0	271	NA
5-03	0	574	NA
8-03	0	289	NA

	W4	28	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
8-88	0	0	0
10-88	0	1	8
6-89	0	1	16
5-90	0	0	0
2-92	0	2	6
3-92	0	9	NA
5-94	0	0	0
5-96	0	0	NA
10-96	0	0	NA
4-97	0	0	NA
5-98	0	0	NA
9-98	0	1	NA
5-99	0	1	NA
9-99	0	0	NA
5-00	0	2	NA
9-00	0	1	NA
5-01	0	2	NA
8-014	0	0	NA
5-02	0	0	NA
9-02	0	0	NA
5-03	0	0	NA
8-03	0	0	NA

W424				
Sampling Date	Total GPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
8-88	0	. 0	10	
10-88	0	0.	0	
6-89	0	1 .	17	
5-90	0.5	0	. 0	
2-92	0	. 5	0	
3-92	0	11	0	
5-94	0.	0	- 0	
5-96	0	0	NA	
10-96	0	0	NA NA	
4-97	. 0	0	NA	
9-97	0	0	NA	
5-98	0	0.	NA	
9-98	0	0,	NA	
5-99	0	0	NA	
9-99	0 (4)	0	NA	
- 5-00	0.	0	NA -	
9-00	0	0	NA	

Sampling	Total	Total	Total
Date	CPAH1	Other PAH <sup>2</sup>	Phenolics

Sampling	Total	Total	Total
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>	Phenolics

#### Table 7-1

Historical Summ

Other PAH, CPAH, and ical Results

Phenol ical Res 198 agh 2003

Platteville Aquifer Wells

PAH concentrations in micrograms per liter (ug/l) Phenolic concentrations in micrograms per liter (ug/l)

	W	/432	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
2-92	0	8	6
3-92	0	4	NA
5-96	0	1. 3	NA
10-96	0	3	NA
4-97	0	10	NA
9-97	0	9	NA
4-98	0	9	NA
9-98	0	19	NA
4-99	0	33	NA
9-99	0	12	NA -
5-00	0	13	NA :
9-00	0	27	NA -

	W431				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics		
2-92	0	4	0		
3-92	0	2	0		
5-96	0	1	NA		
10-96	0	2	NA		
4-97	0	1	NA		
9-97	0	1	NA		
5-98	0	1	NA		
9-98	0	0	NA		
5-99	0	1	NA		
9-99	0	0	NA		
5-00	0	0	NA		
9-00	0	0	NA		
5-01	0	0	NA		
8-014	0	0	NA		
5-02	0	0	NA		
9-02	0	6	NA		
5-03	0	0	NA		
8-03	0	0	NA		

Sampling	g Total	Total	Total
Date	CPAH1	Other PAH <sup>2</sup>	Phenolics
5-96	0	0	NA
10-96	0	1	NA
4-97	0	0	NA
10-97	0	2	NA
5-98	0	1	NA
9-98	0	2	NA
4-99	0	3	NA
9-99	0	1	NA
5-00	0	1	NA
9-00	0	1	NA
5-01	0	1	NA
9-014	0	1	NA
5-02	0	0	NA
9-02	0	3	NA
5-03	0	0	NA
8-03	0	0	NA

	V	/435	
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
2-92	0	0	0
3-92	0	1	- 0

W437				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
2-92	0	3,096	20	
3-92	0	489	NA	
5-01	0	6,305	NA	
8-014	0	5,342	NA	
5-02	0	5,438	NA	
9-02	0	5,292	NA	
5-03	0	1,116	NA	
8-03	0	5,977	NA	

	W438					
Sampling	Total	Total	Total			
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>	Phenolics			
2-92	0	20	5			
3-92	0	0	NA			
5-01	1	1	NA			
9-014	1	1	NA			
5-02	0	5	NA			
9-02	0	0	NA			
5-03	0	0	NA			
8-03	0	0	NA			

Table 7-1

Historical Summ

Phenol

ther PAH, CPAH, and cal Results

198 gh 2003

#### Platteville Aquifer Wells

PAH concentrations in micrograms per liter (ug/l) Phenolic concentrations in micrograms per liter (ug/l)

	W120				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics		
8-88	0	35	44		
10-88	0	41	57		
6-89	0	76	48		
5-96	0	2	NA		
10-96	0		NA		
4-97	0	12	NA		
9-97	0	6	NA		
4-98	0	- 2	NA		
9-98	0	4	NA		
4-99	0	3	NA .		
9-99	0	2	NA NA		
5-00	0	2	NA		
9-00	0 -	2	NA -		

#### NOTES:

 benzo(a) anthracene
 indeno(1,2,3-cd)pyrene

 benzo(a)pyrene
 quinoline\*

 benzo(b)flouranthene
 benzo(j)fluoranthene\*\*

 chrysene
 benzo(g,h,i)perylene

dibenz(a,h)anthracene

acenapthene biphenyl indene acenaphthylene carbazole indole acridine dibenzofuran 1-methylnaphth anthracene dibenzothiophene 2-methylnaphth benzo(k)fluoranthene 2.3-dihydroindene naphthalene 2,3-benzofuran fluoranthene perylene benzo(e)pyrene fluorene phenanthrene benzo(b)thiophene pyrene

NA = Not analyzed for identified compound class.

<sup>&</sup>lt;sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1)), consist of the sum of:

<sup>\*</sup>Quinoline is included in the sum of CPAH if other CPAHs were detected. If no CPAHs are detected, quinoline is included in the Total Other PAH.

<sup>\*\*</sup>Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene. Benzo(j)fluoranthene can not be consistantly separated by the laboratory. Therefore if present, it will be reported as benzo(b)- and/or benzo(k)-fluoranthene.

<sup>&</sup>lt;sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2), consists of the sum of:

<sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit, or were below 0.5 ug/l.

<sup>&</sup>lt;sup>4</sup> For this report, the analytical results prior to 2002 have been rounded to the nearest part per billion.

# 8.0 DRIFT AQUIFER

In accordance with the 2003 Sampling Plan, 11 Drift Aquifer monitoring wells were sampled twice in 2003. In addition to water quality monitoring, groundwater elevations were measured in 20 Drift Aquifer wells on April 18, and August 1, 2003. Summaries of analytical data and groundwater elevations for the first and second half of 2003 are shown in Figures 8-1 and 8-2 respectively. Laboratory reports of the analytical data are included in the Appendices. The Guide to Appended Laboratory Results for all of 2003 precedes the Appendices.

Table 8-1 is a historical summary since 1988 of Other PAH, carcinogenic PAH, and phenolic data for the Drift Aquifer wells. The 2003 analytical results for all Drift Aquifer wells are reported in micrograms per liter (ug/l), or parts per billion. Some of the wells sampled indicate a decrease in total PAH concentrations from prior years.

PAH concentrations were found in five of the 11 wells sampled in 2003. Concentrations ranged from a high of 60 ug/l in P307 to a low of 4 ug/l in W422. Carcinogenic PAH were not detected above detection limits in any of the Drift Aquifer wells sampled in 2003. Water quality in the Drift Aquifer remains unchanged from prior years.

The water level contours illustrated in Figures 8-1 and 8-2 show that the source control well W420 is capturing the groundwater flow beneath the bog area located between Lake Street and Walker Street. The source control well W439 is limiting the further spread of PAH in the Northern Area of the Drift Aquifer. The two Drift Aquifer source control wells combine to limit the spread of PAH in the regional east-southeast groundwater flow direction.

# NON-RESPONSIVE

# **LEGEND**



Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppb)
Total Carcinogenic PAH (ppb)
Total Other PAH (ppb)
0 = Not detected
- = Not sampled

 $\wedge$ 

2 Foot Groundwater Level Contour

# 0 500 1,000

2,000

# FIGURE 8-1

Summary of Groundwater Monitoring Results Drift Aquifer First Half, 2003

DRAWN:	DATE:	REV:
A. DESILETS	2/23/2004	
CHECKED:	PROJECT:	1





# **LEGEND**



Reilly Site



Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and
Dibenz(a,h)anthracene (ppb)
Total Carcinogenic PAH (ppb)
Total Other PAH (ppb)
0 = Not detected
- = Not sampled



2 Foot Groundwater Level Contour



# FIGURE 8-2

Summary of Groundwater Monitoring Results Drift Aquifer Second Half, 2003

DRAWN: A. DESILETS	DATE: 2/23/2004	REV:
CHECKED: B. GREGG	PROJECT: 1620-032	1



NON-RESPONSIVE



INFERRED AREA



WELL LOCATION WELL IDENTIFICATION

# FIGURE 8-3

INFERRED AREA WHERE GROUNDWATER
IN THE DRIFT AQUIFER EXCEEDS
DRINKING WATER CRITERIA, 2003

DRAWN:	A.	TARARA	DATE:	2/27/04	PROJE
	-				1

FILE No.: FIG 8-3.dwg CHECKED: WMG

PROJECT No.: 01620-032



### Table 8-1 Historical Summary of Other PAH, CPAH, and Phenolic Analytical Results 1988 Through 2003

# **Drift Aquifer Wells**

PAH concentrations in micrograms per liter (ug/l). Phenolic concentrations in micrograms per liter (ug/l).

P109				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
8-88	0 3	3	8	
10-88	0	4	0	
6-89	0	4	15.5	
5-90	0	5	0	
4-01	0	1	NA	
9-014	0	0	NA	
5-02	0	0	NA	
9-02	0	0	NA	
5-03	0	0	NA	
8-03	0	0	NA	

and good to	W11 has a second of				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics		
8-88	0 -	13	7.1		
10-88	0	37	7.2		
6-89	0	147	22.1		
5-01	0	0	NA		
	Well Aband	loned in 2001			

P307			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
4-91	0	226	18.5
8-014	0	76	NA
5-02	0	42	NA
9-02	0	89	NA
5-03	0	42	NA
8-03	0	60	NA

P308				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
4-91	0	98	10.5	
2-92	0	0	11.7	
10-94	0	41	NA	
5-01	0	2	NA	
8-014	0	12	NA	
5-02	0	3	NA	
9-02	0	0	NA	
5-03	0	0	NA	
8-03	0	0	NA	

	P112				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics		
8-88	0	0	0		
10-88	0	0	8.6		
6-89	0	0	35.7		
5-90	0	0	0		
2-92	0	0	0		
5-01	0	0	NA		
8-014	0	0	NA		
5-02	0	0	NA		
9-02	0	0	NA		
5-03	0	0	NA		
8-03	0	0	NA		

	P310			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
4-91	0	33	8	
5-01	0	13	NA	
8-01⁴	0	31	NA	
5-02	0	14	NA	
9-02	0	10	NA	
5-03	0	16	NA	
8-03	0	18	NA	

P312				
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics	
4-91	0	14	13	
2-92	0	23	15	
4-01	0	3	NA	
9-014	0	4	NA	
5-02	0	4	NA	
9-02	0	5	NA	
5-03	0	9	NA	
8-03	0	32	NA	

P309			
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics
6-89	0	1	0
4-91	0	318	22.5
5-01	0	27	NA
8-014	0	40	NA
5-02	0	50	NA
9-02	0	24	NA
5-03	0	91	NA
8-03	0	43	NA

W117						
Sampling	Total	Total	Total			
Date	CPAH1	Other PAH <sup>2</sup>	Phenolics			
8-88	0	2	8.3			
10-88	0	18	0			
6-89	0	28	13.5			
5-90	0	29	10.5			
2-92	0	1	0			
5-94	0	5	0			
10-94	0	2	NA			
4-01	0	2	NA			
9-01⁴	0	1	NA			
5-02	0	0	NA			
9-02	0	0	NA			
5-03	0	0	NA			
8-03	0	0	NA			

#### Table 8-1 Historical Summary of Other PAH, CPAH, and Phenolic Analytical Results 1988 Through 2003

### **Drift Aquifer Wells**

PAH concentrations in micrograms per liter (ug/l). Phenolic concentrations in micrograms per liter (ug/l).

W136						
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics			
8-88	0	0	50			
10-88	0	0	0			
6-89	0	1	0			
2-92	0	1	0			
5-94	0	0	0			
10-94	0	0	NA			
5-01	0	0	NA			
8-01 <sup>4</sup>	0	0	NA			
5-02	0	0	NA			
9-02	0	0	NA			
5-03 0		0	NA			
8-03	8-03 0 0		NA			

W427						
Sampling Date	Total CPAH <sup>1</sup>	Total Other PAH <sup>2</sup>	Total Phenolics			
8-88	0	0	7			
10-88	0	0	0			
6-89	0	1	0			
5-90	0	0	0			
2-92	0	5	0			
10-94 0		0	NA			
5-01 <sup>4</sup>	0	0	NA			
5-02	0	0	NA			
9-02	0	0	NA			
5-03	0	0	NA			
8-03	0	0	NA			

<sup>1</sup> Total Carcinogenic PAHs (as listed in the CD/RAP (A.1.1)), consist of the sum of:

 benzo(a) anthracene
 indeno(1,2,3-cd)pyrene

 benzo(a)pyrene
 quinoline\*

 benzo(b)flouranthene
 benzo(j)fluoranthene\*\*

 chrysene
 benzo(g,h,i)perylene

dibenz(a,h)anthracene

<sup>2</sup> Total Other PAHs (as listed in the CD/RAP (A.1.2), consists of the sum of:

acenapthene	biphenyl	indene
acenaphthylene	carbazole	indole
acridine	dibenzofuran	1-methylnaphthalene
anthracene	dibenzothiophene	2-methylnaphthalene
benzo(k)fluoranthene	2,3-dihydroindene	naphthalene
2,3-benzofuran	fluoranthene	perylene
benzo(e)pyrene	fluorene	phenanthrene
benzo(b)thiophene		pyrene

<sup>&</sup>lt;sup>3</sup> Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit, or were below 0.5 ug/l.

NA = Not analyzed for identified compound class.

W422						
Sampling	Total	Total	Total			
Date	CPAH <sup>1</sup>	Other PAH <sup>2</sup>	Phenolics			
1st Quarter	0	27	11			
2nd Quarter	0	57	0			
8-88	0	77	24			
10-88 3-89	0	50	84			
		50	11			
6-89	0	50	14			
9-89	0	60	20			
12-89	0	50	13			
3-90	0	75	21			
5-90	0	60	14			
8-90	0	90	14			
12-90	0	60	18			
4-91	0	67	13			
9-91	0	-	17			
10-91	0	88	18			
2-92	0	121	16			
6-92	0	872	-			
9-92	0	91	9			
10-92	0	89	28			
3-93	0	94	0			
4-93	0	96	10			
8-93	0	81	16			
11-93	0	74	16			
2-94	0	61	0			
6-94	0	66	7			
8-94	0	66	30			
10-94	0	59	11			
3-95	0	54	11			
5-95	0	62	5			
9-95	0	53	14			
10-95	0	29	10			
2-96	0	24	12			
4-96	0	26	11			
7-96	0	26	9			
10-96	0	23	8			
2-97	0	21	9			
5-97	0	20	11			
9-97	0	19	18			
1-98	0	18	11			
2-98	0	21	6			
5-98	0	17	9			
9-98 11-98	0	7 13	9			
11-98 3-99	0	13 20	0			
3-99 4-99	0	14	8			
8-99	0	13	10			
11-99	0	13	4			
2-00	0	12	10			
5-00						
9-00	0	19 13	10 5			
12-00	0	6	4			
5-01						
5-01 9-01	0	19 13	5			
10-01	0	13 7	5			
3-02	0	15	11			
5-02	0	15	1.1			
9-02	0	9				
5-02	0	9				
8-03	0	4				

<sup>\*</sup>Quinoline is included in the sum of CPAH if other CPAHs were detected. If no CPAHs are detected, quinoline is included in the Total Other PAH.

<sup>\*\*</sup>Benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene. Benzo(j)fluoranthene can not be consistantly separated by the laboratory. Therefore if present, it will be reported as benzo(b)- and/or benzo(k)-fluoranthene.

<sup>&</sup>lt;sup>4</sup> For this report, the analytical results prior to 2002 have been rounded to the nearest part per billion.

# 9.0 DATA QUALITY ASSESSMENT

In accordance with the 2003 Sampling Plan, all laboratory data packages underwent a data quality assessment (DQA) conducted by ENSR. Two laboratory data packages underwent a full validation following the "Region 5, Standard Operating Procedure for Validation of CLP Organic Data", (April 1991, Revised February 1997). One data package from each of the second and third quarter monitoring events was selected for the full validation.

The basis for the review, including the elements to be reviewed and applicable validation guidelines were defined in the Quality Assurance Project Plan (QAPP). The 2003 DQA was conducted as follows. The number of samples was checked to verify that the results corresponded to the analytical requests designated on the chain of custody. The chain of custody was examined to determine the completeness pertaining to sampling dates, times, quantities, and analyses performed. The sample holding times, preservation, and cooler temperatures were noted. The method blanks, field blanks, equipment blanks, and trip blanks were examined for any contamination problems. Surrogate spike recoveries were checked to confirm they were within the range determined by the QAPP QC limits. Matrix spikes and LCS were reviewed to confirm they meet the QC acceptance criteria. All duplicate samples were checked for precision. In addition, sample quantitation limits (SQLs) were compared to those required in the QAPP.

The full validation of 2003 data included all of the information in the DQA with additional assessment pertaining to the laboratory instrumentation and practices. This included initial and continuing instrument calibration, instrument tuning, compound identification, and internal standard performance. The results of the full validation can be found at the end of data packages J and U. Instrument calibration, tuning, compound identification, and internal standard performance were found to be valid for 2003. The data validation is generally used to determine whether or not the reported laboratory data may be used for decision-making purposes.

All 2003 laboratory data packages (labeled A through W) were reviewed by ENSR during the DQA. ENSR found that the data packages contain usable results for all wells that were sampled in 2003. Some of the surrogate recoveries were lower than the stated laboratory QAPP control limits. Therefore, any positive results for the samples with surrogates outside the control limits are estimated. All estimated data are included as part of the PAH sums that constitute Drinking Water Criteria and Advisory Levels for this project.

PAH were detected in a couple of the Method Blanks at concentrations less than five times the



reporting limit (SQL). All results with Method Blank concentrations are qualified with a "B". All concentrations qualified with a B are included in the total PAH calculations.

Field Blank contamination is not used to qualify laboratory data in Region V. Any Field Blank contamination was noted on the DQA reports.

Some non-detected results for benzo(e)pyrene and quinoline were rejected (e.g. Appendix U) since the compounds did not recover in the MS/MSD for a few of the samples in 2003.

Overall, the 2003 laboratory data was found to be usable for evaluating PAH concentrations in the groundwater and decision-making purposes. The overall completeness goal of 95% established in the QAPP was fulfilled in 2003.

This project benefits from years of collecting high quality data in accordance with the Agency approved Sampling Plan and QAPP. Therefore, an additional measure of quality assurance is gained by comparing current analytical results to the historical analytical results.

Criteria for validation actions were specified in the QAPP, data review worksheets, or the appropriate validation guidelines and were given precedence in that order. QAPP criteria were used for surrogate, MS/MSD, and LCS recoveries.

Validation actions were documented on internal data review worksheets and were summarized in the DQA reports that included the following:

- · Samples included in the validation or data assessment,
- Validation guidelines used, including any project-specific modifications,
- Analyses performed,
- Review elements, and
- Discussion of validation/assessment results, including any qualifiers appended.

The DQA reports can be found at the backs of each laboratory data package for 2003.

The 2003 sampling data has been reviewed and the QAPP goals for field and laboratory completeness have been met. The Laboratory reports of the analytical data are included in the Appendices. The Guide to Appended Laboratory Results for all of 2003 precedes the Appendices.



Well		1st	Appendix	2nd	Appendix	3rd	Appendix	4th	Appendix
Name	Analysis	Quarter	ID	Quarter	ID	Quarter	ID ID	Quarter	ID
Itamo	ritaryoto			<u></u>		<u> </u>		<u> </u>	-
ronton-Galesville	Aquifer								
W105	Not Sampled						Marine Control		
	2.331								
Mount Simon Hind	kley Aquifer								
SLP 11	PPT 5					19-Aug	S		
SLP 12	PPT 5					19-Aug	S		
SLP 13	PPT 5					19-Aug	S		
SLP 17	Not Sampled								
Prairie du Chien-J	ordan Aguifer								
SLP 4	PPT 5			20-May	К				
W 23	PPT 75			20-iviay	IX.	2-Sep	U		
VV 23	FF175					2-бер	Ü		
SLP 6	PPT 5	10-Mar	В	27-May	L	19-Aug	S	4-Nov	W
SLP 7 or SLP 9	Not Sampled								
SLP 10 or SLP 15	PPT 75					2-Sep	U		
SLP 14	Not Sampled					2 000			
SLP 16	Not Sampled	Land Control	E 26 800 E		A 14 14 14 14 14 14 14 14 14 14 14 14 14				
W 119	PPT 5							21-Oct	V
W 402	PPT 5			20-May	K				
W 403	PPT 5			20-May	K				
W 405 or W 406	Not Sampled		- Ph. 34	20 11.0.9					
W70	PPT 5			20-May	K				
W 29	PPT 5			20-May	K				
W 40	Not Sampled			==,	.,				
E 3	PPT 5					18-Aug	R		
H 6	Not Sampled		1						
MTKA 6	Not Sampled						Section 1		
W48	PPT 5	10-Mar	В	20-May	K	19-Aug	S	21-Oct	V
W401	PPT 5					19-Aug	S		
E2	PPT 5					18-Aug	R		
E7	PPT 5					18-Aug	R		
E13	PPT 5	- C				18-Aug	R		3
E15	PPT 5				D.	18-Aug	R		

St. Peter Aquifer  SLP 3  W 122  F W 411  F W 24  P W 33  P W 133  F W 410  P W 412  F W 409  Prift-Platteville Aquifer P  W 420  PA  W 421  PA  W 434  PA  W 439  Platteville Aquifer  W20  W131  W428  W431  W 101  W433  W27  W143  W437	PPT 5 PPT 5 PPT 75 PPT 75 PPT 75 PPT 75 PPT 75 PPT 75 PPT 5 PPT 5 PPT 5 PPB	1st Quarter	Appendix <u>ID</u>	2nd Quarter 19-May 19-May 19-May 2-Jun 2-Jun	Appendix ID  J J J M	3rd Quarter  25-Aug 25-Aug 25-Aug 25-Aug	Appendix ID  T T	4th <u>Quarter</u>	Appendix <u>ID</u>
St. Peter Aquifer  SLP 3	PPT 5 PPT 5 PPT 75 PPT 75 PPT 75 PPT 75 PPT 75 PPT 5 PPT 5 PPB	Quarter	<u>ID</u>	19-May 19-May 19-May 2-Jun	J	25-Aug 25-Aug	T T	<u>Quarter</u>	<u>ID</u>
SLP 3  W 122  F W 111  F W 24  P W 33  P W 133  F W 410  P W 412  F W 409  Prift-Platteville Aquifer P W 420  W 421  P A W 434  P A W 439  Platteville Aquifer  W20  W131  W428  W431  W 101  W433  W27  W143  W437	PPT 5 PPT 75 PPT 75 PPT 75 PPT 75 PPT 75 PPT 5 PPT 5 PPB			19-May 19-May 2-Jun	J	25-Aug	Т		
SLP 3 F W 122 F W 411 F W 24 P W 33 P W 133 F W 410 P W 412 F W 409 F W 420 PA W 421 PA W 434 PA W 439 PA W 439 PA W 439 PA W 439 PA W 431 W431 W431 W433 W27 W 143 W437	PPT 5 PPT 75 PPT 75 PPT 75 PPT 75 PPT 75 PPT 5 PPT 5 PPB			19-May 19-May 2-Jun	J	25-Aug	Т		
W 122 F W 411 F W 24 P W 33 P W 133 F W 410 P W 412 F W 409 P W 420 P W 421 P W 434 P W 439 P Platteville Aquifer P W 439 P Platteville Aquifer P W 400 P W 431 P W 439 P W 431 P W 431 P W 431 P W 433 P W 434 P W 433 P W 434 P W 433 P W 434 P W 435 P W 436 P W 437 P W 43	PPT 5 PPT 75 PPT 75 PPT 75 PPT 75 PPT 75 PPT 5 PPT 5 PPB			19-May 19-May 2-Jun	J	25-Aug	Т		
W 411 F W 24 P W 33 P W 133 F W 410 P W 412 F W 409 P W 420 PA W 421 PA W 434 PA W 439 PA W 439 PA W 439 PA W 439 PA W 431 W 438 W 431 W 431 W 433 W 27 W 443 W 44	PPT 5 PPT 75 PPT 5 PPT 75 PPT 5 PPT 5 PPT 5 PPB			19-May 2-Jun	J				4
W 24 P W 33 P W 133 P W 133 F W 410 P W 412 F W 409  Drift-Platteville Aquifer P W 420 PA W 421 PA W 434 PA W 439 PA Platteville Aquifer W20 W131 W428 W431 W 101 W433 W27 W143 W437	PPT 75 PPT 75 PPT 75 PPT 75 PPT 5 PPB			2-Jun		25-Aug			
W 33	PPT 75 PPT 5 PPT 5 PPB  Pumping We				M		T		
W 133 F W 410 P W 412 F W 409  Drift-Platteville Aquifer P W 420 P W 421 P W 434 P W 439 PA W 439 PA W 439 PA W 439 PA W 431 W 431 W 431 W 431 W 431 W 433 W 27 W 143 W 437	PPT 5 PPT 75 PPT 5 PPB			2-Jun	979	2-Sep	U		
W 410 P W 412 F W 409  Drift-Platteville Aquifer P W 420 P W 421 P W 434 P W 439 P Platteville Aquifer W20 W131 W428 W431 W 101 W433 W27 W143 W437	PPT 75 PPT 5 PPB  Pumping We				M	2-Sep	U		
W 412 F W 409  Drift-Platteville Aquifer P W 420 P W 421 P W 434 P W 439 P Platteville Aquifer W20 W131 W428 W431 W 101 W433 W27 W143 W437	PPT 5 PPB Pumping We			19-May	J	25-Aug	Т		
N 409  Drift-Platteville Aquifer Pi N 420 N 421 Pi N 434 Pi N 439 Platteville Aquifer N20 N131 N428 N431 N 101 N433 N27 N143 N437	PPB  Pumping We			2-Jun	M	2-Sep	U		
Drift-Platteville Aquifer Pi N 420 PA N 421 PA N 434 PA N 439 PA Platteville Aquifer N20 N131 N428 N431 N 101 N433 N27 N143 N437	Pumping We			19-May	J	25-Aug	T		
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W 420 PA W 421 PA W 434 PA W 439 PA Platteville Aquifer W20 W131 W428 W431 W 101 W433 W27 W143 W437	The second liverage and the se	lle							
N 421 PA N 434 PA N 439 PA Platteville Aquifer N20 N131 N428 N431 N 101 N433 N27 N143 N437	AH-PPD	THE RESERVE OF THE PERSON NAMED IN COLUMN	^	12 May		12 Aug	0	4 Nov	W
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N 439 PA  Platteville Aquifer  N20  N131  N428  N431  N 101  N433  N27  N143  N437	PAH-PPB	10-Mar	A	13-May	1	12-Aug	0	4-Nov	W
Platteville Aquifer W20 W131 W428 W431 W 101 W433 W27 W143 W437	PAH-PPB			12-May	Н	11-Aug	Р		
N20 N131 N428 N431 N 101 N433 N27 N143 N437	PAH-PPB			5-May	D	4-Aug	N		
W131 W428 W431 W 101 W433 W27 W143 W437									
W131 W428 W431 W 101 W433 W27 W143 W437	PPB			12-May	G	11-Aug	Р		
N428 N431 N 101 N433 N27 N143 N437	PPB			13-May		12-Aug	0		
N431 N 101 N433 N27 N143 N437	PPB			13-May	i	12-Aug	0		
W 101 W433 W27 W143 W437	PPB			13-May	i	12-Aug	0		
W433 W27 W143 W437	PPB			12-May	G	11-Aug	P		
N27 N143 N437	PPB			12-May	G	11-Aug	P		
W143 W437	PPB			12-May	G	11-Aug	P		
W437	PPB			13-May	- G	12-Aug	0		
	PPB				G		P		
				12-May		11-Aug			
	PPB PPB			13-May	G	12-Aug	0 P		-
77420	PPD			12-May	G	11-Aug	F		<del> </del>
Drift Aquifer									
2109	PPB			6-May	F	5-Aug	Q		
P112	PPB			5-May	С	4-Aug	N		
	PPB			5-May	С	4-Aug	N		
	PPB			5-May	C	4-Aug	N		
	PPB			5-May	C	4-Aug	N		
	PPB			6-May	F	5-Aug	Q		
	PPB				F		Q		
				6-May	<u> </u>	5-Aug	u		
	ot Sampled PPB			6-May	F	5-Aug	Q		
					F		Q		
				6-May		5-Aug			
N422 N427	PPB PPB			6-May 6-May	E F	5-Aug 5-Aug	Q		1

A



# **ANALYTICAL REPORT**

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot#: D3C110158

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

April 10, 2003

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Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
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Analytical Results     OC Pote Association Surreys	
QC Data Association Summary  Chair of Courts Inc.	
• Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
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Volatile GC	
Semivolatile GC	
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• General Chemistry	
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# CASE NARRATIVE D3C110158

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

### Sample Receiving

Five samples were received under chain of custody on March 11, 2003. The samples were received in good condition temperatures of 2.2°C, 3.6°C, 4.6°C, 2.7°C, 2.3°C and 2.4°C.

### Polynuclear Aromatic Hydrocarbons, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3C110158-001 and 002 were analyzed at a 10x dilution for 2,3-dihyroindene and at a 40x dilution for naphthalene, due to high concentrations of target compounds. Naphthalene is reported from the 1x dilution as well because the MS/MSD was performed on this sample. Sample 005 was analyzed at a dilution for fluoranthene, phenanthrene and pyrene due to high concentrations of target compounds. As a result of the required dilutions, the surrogate recoveries were not calculated because the sample amount was greater than four times the spike amount. It is the laboratory's policy to consider all surrogates in the analyses with dilution factors of four or greater to be diluted out.

The MS performed on sample D3C110158-001 demonstrated a recovery that was above control limits for naphthalene. The MSD was in control.

No other anomalies were observed.

# Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 99.5% completeness.

DATA COMPLETENESS CALCULATION					
	D3C110158	OLA I ION			
	PAHs by SW	19.48 9270C			
ANAL 1313.	FAITS BY SI	1040-02/00			
QC Parameter	Data	Valid Data			
CO Parameter	Planned	Obtained			
Method Blank	31	31			
MB Surrogates	3	3			
LCS	7	7			
LCS Surrogates	3	3			
FB/FBD	62	62			
MS	7	6			
MS Surrogates	3	3			
MSD	7	7			
MSD Surrogates	3	3			
MS/MSD RPD	7	7			
Sample/Dup. RPD	31	31			
Sample Surrogates	15	15			
Internal STD Area	27	27			
TOTAL	206	205			
% Completeness		99.5%			

<sup>\*</sup>A MS/MSD was performed on sample W420-031003.

# Sample Duplicate Calculation for Method 8270C

S	Sample Duplicate RPD Calculation Lot D3C110158						
Sample: W420-031003		DUP: W420D-031003					
Compound	Result	Compound	Result	RPD	RPD>50%		
Acenaphthene	140	Acenaphthene	130	7.4			
Acenaphthylene	ND	Acenaphthylene	ND	0.0	<u> </u>		
Acridine	ND	Acridine	ND	0.0			
Anthracene	2.0	Anthracene	2.0	0.0			
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0			
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0			
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0			
2,3-Benzofuran	41	2,3-Benzofuran	39	5.0			
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0			
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0			
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0			
Benzo(b)thiophene	120	Benzo(b)thiophene	120	0.0			
Biphenyl	21	Biphenyl	20	4.9			
Carbazole	79	Carbazole	75	5.2			
Chrysene	ND	Chrysene	ND	0.0			
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0			
Dibenzofuran	46	Dibenzofuran	44	4.4			
Dibenzothiophene	9.8	Dibenzothlophene	9.5	3.1			
2,3-Dihydroindene	300	2,3-Dihydroindene	270	10.5			
Fluoranthene	ND	Fluoranthene	ND	0.0			
Fluorene	45	Fluorene	43	4.5			
Indene	33	Indene	31	6.3			
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0			
Indole	ND	Indole	ND	0.0			
2-Methylnaphthalene	140	2-Methylnaphthalene	130	7.4			
1-Methylnaphthalene	150	1-Methylnaphthalene	140	6.9			
Naphthalene	2400	Naphthalene	2300	4.3			
Perylene	ND	Perylene	ND	0.0			
Phenanthrene	31	Phenánthrene	30	3.3			
Pyrene	ND	Pyrene	ND	0.0			
Quinoline	ND	Quinoline	ND	0.0			

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits

<sup>\*</sup>NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3C110158

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W420-031003 03/10/03 13:30 001				
Acenaphthene	140	10	uq/L	SW846 8270C
Anthracene	2.0 J	10	ug/L	SW846 8270C
2,3-Benzofuran	41	10	ug/L	SW846 8270C
Benzo(b)thiophene	120	10	ug/L	SW846 8270C
Biphenyl	21	10	ug/L	SW846 8270C
Carbazole	79	10	ug/L	SW846 8270C
Dibenzofuran	46	10	ug/L	SW846 8270C
Dibenzothiophene	9.8 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	300	100	ug/L	SW846 8270C
Fluorene	45	10	ug/L	SW846 8270C
Indene	33	10	ug/L	SW846 8270C
2-Methylnaphthalene	140	10	ug/L	SW846 8270C
1-Methylnaphthalene	150	10	ug/L	SW846 8270C
Naphthalene	720 E	10	ug/L	SW846 8270C
Naphthalene	2400	400	ug/L	SW846 8270C
Phenanthrene	31	10	ug/L	SW846 8270C
W420D-031003 03/10/03 13:30 002				·
Acenaphthene	130	10	ug/L	SW846 8270C
Anthracene	2.0 J	10	ug/L	SW846 8270C
2,3-Benzofuran	39	10	ug/L	SW846 8270C
Benzo(b)thiophene	120	10	ug/L	SW846 8270C
Biphenyl	20	10	ug/L	SW846 8270C
Carbazole	75	10	ug/L	SW846 8270C
Dibenzofuran	44	10	ug/L	SW846 8270C
Dibenzothiophene	9.5 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	270	100	ug/L	SW846 8270C
Fluorene	43	10	ug/L	SW846 8270C
Indene	31	10	ug/L	SW846 8270C
2-Methylnaphthalene	130	10	ug/L	SW846 8270C
1-Methylnaphthalene	140	10	ug/L	SW846 8270C
Naphthalene	2300	400	ug/L	SW846 8270C
Phenanthrene	30	10	ug/L	SW846 8270C
W421-031003 03/10/03 13:50 005				
Acenaphthene	84	10	ug/L	SW846 8270C
Acenaphthylene	2.4 J	10	ug/L	SW846 8270C
Acridine	6.2 J	10	ug/L	SW846 8270C
Anthracene	33	10	ug/L	SW846 8270C
Benzo (a) anthracene	100	10	ug/L	SW846 8270C
Benzo(b)fluoranthene	62	10	ug/L	SW846 8270C

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3C110158

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W421-031003 03/10/03 13:50 005				
Benzo(k) fluoranthene	59	10	ug/L	SW846 8270C
Benzo(ghi)perylene	27	10	ug/L	SW846 8270C
Benzo (a) pyrene	70	10	ug/L	SW846 8270C
Benzo(e)pyrene	43	10	ug/L	SW846 8270C
Benzo(b) thiophene	18	10	ug/L	SW846 8270C
Biphenyl	3.5 J	10	ug/L	SW846 8270C
Carbazole	21	10	ug/L	SW846 8270C
Chrysene	78	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	9.9 J	10	ug/L	SW846 8270C
Dibenzofuran	21	10	ug/L	SW846 8270C
Dibenzothiophene	12	10	ug/L	SW846 8270C
2,3-Dihydroindene	94	10	ug/L	SW846 8270C
Fluoranthene	380	50	ug/L	SW846 8270C
Fluorene	44	10	ug/L	SW846 8270C
Indene	25	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	24	10	ug/L	SW846 8270C
2-Methylnaphthalene	6.0 J	10	ug/L	SW846 8270C
1-Methylnaphthalene	37	10	ug/L	SW846 8270C
Naphthalene	37	10	ug/L	SW846 8270C
Perylene	15	10	ug/L	SW846 8270C
Phenanthrene	150	50	ug/L	SW846 8270C
Pyrene	270	50	ug/L	SW846 8270C

# **METHODS SUMMARY**

# D3C110158

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# METHOD / ANALYST SUMMARY

### D3C110158

ANALYTICAL METHOD	ANALYST	ANALYS <b>T</b> ID
SW846 8270C	Mark McDaniel	000998
SW846 8270C	Tim O'Donnell	000443
References:	•	

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

#### D3C110158

<u>wo</u> #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FJXAK	001	W420-031003	03/10/03	13:30
FJXAV	002	W420D-031003	03/10/03	
FJXAW	003	W420FB-031003	03/10/03	13:45
FJXA0	004	W420FBD-031003	03/10/03	
FJXA3	005	W421-031003	03/10/03	13:50
370mm (	-1			

#### MOTR (2)

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: W420-031003

# GC/MS Semivolatiles

_			
Lot-Sample #: D3C110158-001	Work Order #:	FJXAK1AA	Matrix WG
Date Sampled: 03/10/03	Date Received:		
Prep Date: 03/14/03	Analysis Date:		
Prep Batch #: 3073349	Analysis Time:	18:10	
Dilution Factor: 1			
	Method:	SW846 8270	oc
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	140	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	2.0 J	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b)fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	41	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo(e) pyrene	ND	10	ug/L
Benzo(b) thiophene	120	10	ug/L
Biphenyl	21	10	ug/L
Carbazole	79	10	uq/L
Chrysene	ND	10	ug/L
Dibenzo(a,h) anthracene	ND	10	ug/L
Dibenzofuran	46	10	uq/L
Dibenzothiophene	9.8 J	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	45	10	ug/L
Indene	33	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	140	10	ug/L
1-Methylnaphthalene	150	10	ug/L
Naphthalene	720 B	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	31	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	94	(30 - 160)	
Fluorene d-10	56	(36 - 127)	
Naphthalene-d8	67	(37 - 107)	
·	₹•	(3, 107)	

# NOTE(S):

J Estimated result. Result is less than RL.

E Estimated result, Result concentration exceeds the calibration range.

# Client Sample ID: W420-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110158-003 Date Sampled: 03/10/03 Prep Date: 03/14/03 Prep Batch #: 3073349 Dilution Factor: 10	Work Order #: Date Received: Analysis Date: Analysis Time:	03/11/03 03/27/03	Matrix: WG
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
2,3-Dihydroindene	300	100	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	DIL,NC	(30 - 160)	•
Fluorene d-10	DIL, NC	(36 - 127)	
Naphthalene-d8	DIL,NC	(37 - 107)	
NOTE(S):			

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

# Client Sample ID: W420-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110158-0 Date Sampled: 03/10/03 Prep Date: 03/14/03 Prep Batch #: 3073349 Dilution Factor: 40	01 Work Order #: Date Received: Analysis Date: Analysis Time:	03/11/03	Matrix: WG
	Method:	: SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Naphthalene	2400	400	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	DIL, NC	(30 - 160)	•
Fluorene d-10	DIL,NC	(36 - 127)	
Naphthalene-d8	DIL, NC	(37 - 107)	
NOTE(S):			

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

# Client Sample ID: W420D-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110158-002	Work Order #:	FJXAV1AA	Matrix WG
Date Sampled: 03/10/03	Date Received:		
Prep Date: 03/14/03	Analysis Date:		
Prep Batch #: 3073349	Analysis Time:		
Dilution Factor: 1		20,02	
21100101 100001. 1	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	130	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	2.0 J	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	39	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	120	10	ug/L
Biphenyl	20	10	ug/L
Carbazole	75	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	44	10	ug/L
Dibenzothiophene	9.5 J	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	43	10	ug/L
Indene	31	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	130	10	ug/L
1-Methylnaphthalene	140	10	ug/L
Perylene	ND -	10	ug/L
Phenanthrene	30	10	ug/L
Pyrene	ИD	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	<b>\</b>
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	86	(30 - 160)	•
Fluorene d-10	54	(36 - 127)	
Naphthalene-d8	63	(37 - 107)	
-		·	
NOTE (S):			

J Estimated result. Result is less than RL.

# Client Sample ID: W420D-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110158-002 Date Sampled: 03/10/03 Prep Date: 03/14/03 Prep Batch #: 3073349 Dilution Factor: 10	Work Order #: Date Received: Analysis Date: Analysis Time:	03/11/03 03/27/03	Matrix wG
	Method:	SW846 8270	С
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
2,3-Dihydroindene	270	100	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	DIL,NC	(30 - 160)	
Fluorene d-10	DIL, NC	(36 - 127)	
Naphthalene-d8	DIL, NC	(37 - 107)	
NOTE (S):			

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

Client Sample ID: W420D-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110158-0 Date Sampled: 03/10/03 Prep Date: 03/14/03 Prep Batch #: 3073349 Dilution Factor: 40	02 Work Order #: Date Received: Analysis Date: Analysis Time:	03/11/03 03/27/03	Matrix: WG
	Method:	SW846 8270	C
PARAMETER Naphthalene	RESULT 2300	REPORTING LIMIT 400	UNITS ug/L
GUDD 0.43 W.	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	DIL,NC	(30 - 160)	
Fluorene d-10	DIL,NC	(36 - 127)	
Naphthalene-d8	DIL, NC	(37 - 107)	
Monra (a)	•		

NOTE(S):

. :

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

### Client Sample ID: W420FB-031003

# GC/MS Semivolatiles

Lot-Sample #:	D3C110158~003	Work Order #: FJXAW1AA	Matrix WG

 Date Sampled...:
 03/10/03
 Date Received...:
 03/11/03

 Prep Date.....:
 03/14/03
 Analysis Date...:
 03/26/03

 Prep Batch #...:
 3073349
 Analysis Time...:
 20:43

Dilution Factor: 1

Method..... SW846 8270C

DADAMETED	DECITE OF	REPORTING	IBITEO
PARAMETER Acenaphthene	RESULT ND	LIMIT	UNITS ug/L
<del>-</del>	ND	10	_
Acenaphthylene Acridine		= :	ug/L
	ИD	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a,h) anthracene	ND	10 .	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	NTD	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
X 44444 - 4444	****	10	~2/ H
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	105	(30 - 160)	-
Fluorene d-10	62	(36 - 127)	
Naphthalene-d8	73	(37 - 107)	
mpirematerie - 00	, ,	(3) - 10)	

# Client Sample ID: W420FBD-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110158-004	Work Order #: FJXA01AA	Matrix WG
Date Sampled: 03/10/03	Date Received: 03/11/03	
Prep Date: 03/14/03	Analysis Date: 03/26/03	
Prep Batch #: 3073349	Analysis Time: 21:21	

Dilution Factor: 1

Method.....: SW846 8270C

		DEDODETNO	
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
luoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
L-Methylnaphthalene	ND	10	ug/L
Japhthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	DEDCEME	PECOMES!	
SIDDOGATD	PERCENT	RECOVERY	
SURROGATE Chrysene-d12	RECOVERY	LIMITS	-
_	101	(30 - 160)	
Fluorene d-10	58	(36 - 127)	
Naphthalene-d8	68	(37 - 107)	

#### Client Sample ID: W421-031003

# GC/MS Semivolatiles

Lot-Sample #:	D3C110158-005	Work Order #:	FJXA31AA	Matrix WG
n 4 - 1 1	00/10/00		00/11/00	

 Date Sampled...:
 03/10/03
 Date Received...:
 03/11/03

 Prep Date....:
 03/14/03
 Analysis Date...:
 03/26/03

 Prep Batch #...:
 3073349
 Analysis Time...:
 21:59

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	84	10	ug/L
Acenaphthylene	2.4 Ј	10	ug/L
Acridine	6.2 J	10	ug/L
Anthracene	33	10	ug/L
Benzo (a) anthracene	100	10	ug/L
Benzo (b) fluoranthene	62	10	ug/L
Benzo (k) fluoranthene	59	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo (ghi) perylene	27	10	ug/L
Benzo (a) pyrene	70	10	ug/L
Benzo (e) pyrene	43	10	ug/L
Benzo(b) thiophene	18	10	ug/L
Biphenyl	3.5 J	10	ug/L
Carbazole	21	10	ug/L
Chrysene	78	10	ug/L
Dibenzo (a, h) anthracene	9.9 J	10	ug/L
Dibenzofuran	21	10	ug/L
Dibenzothiophene	12	10	ug/L
2,3-Dihydroindene	94	10	ug/L
Fluorene	44	10	ug/L
Indene	25	10	ug/L
Indeno (1,2,3-cd) pyrene	24	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	6.0 J	10	ug/L
1-Methylnaphthalene	37	10	ug/L
Naphthalene	37	10	ug/L
Perylene	15	10	ug/L
Quinoline	ND	10	ug/L
			_
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	82	(30 - 160	)
Fluorene d-10	62	(36 - 127)	)
Naphthalene-d8	76	(37 - 107	)
_			

<sup>)</sup> Estimated result. Result is less than RL.

NOTE(S):

# Client Sample ID: W421-031003

# GC/MS Semivolatiles

Lot-Sample #: D30 Date Sampled: 03, Prep Date: 03, Prep Batch #: 300 Dilution Factor: 5	/10/03 :	Work Order #: Date Received: Analysis Date: Analysis Time:	03/11/03 03/27/03	Matrix: WG
	1	Method:	SW846 8270	С
			REPORTING	
PARAMETER	:	RESULT	LIMIT	UNITS
Fluoranthene	<u></u>	380	50	ug/L
Phenanthrene		150	50	ug/L
Pyrene		270	50	ug/L
		PERCENT	RECOVERY	
SURROGATE		RECOVERY	LIMITS	
Chrysene-dl2		DIL,NC	(30 - 160)	
Fluorene d-10		DIL,NC	(36 - 127)	
Naphthalene-d8		DIL,NC	(37 - 107)	

OIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

# QC DATA ASSOCIATION SUMMARY

# D3C110158

# Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3073349	3073137
002	WG	SW846 8270C		3073349	3073137
003	WG	SW846 8270C		3073349	3073137
004	WG	SW846 8270C		3073349	3073137
005	WG	SW846 8270C		3073349	3073137

#### METHOD BLANK REPORT

# GC/MS Semivolatiles

Client Lot #...: D3C110158 Work Order #...: FJ6331AA Matrix.....: WATER

MB Lot-Sample #: D3C140000-349

Prep Date....: 03/14/03 Analysis Time..: 16:54

Dilution Factor: 1

		REPORTI		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo (a) anthracene	ND	10	ug/L	SW846 8270C
Benzo (b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k)fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo (ghi) perylene	ND	10	ug/L	SW846 8270C
Benzo(a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
hrysene	ND	10	ug/L	SW846 8270C
Jibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	NID	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVER	Y	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	115	(30 - 10	50)	
Fluorene d-10	62	(36 - 12	-	
Naphthalene-d8	74	(37 - 10	07)	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

# GC/MS Semivolatiles

Client Lot #...: D3C110158 Work Order #...: FJ6331AC Matrix...... WATER

LCS Lot-Sample#: D3C140000-349

Prep Date....: 03/14/03 Analysis Date..: 03/26/03 Prep Batch #...: 3073349 Analysis Time..: 17:32

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	86	(30 - 150)	SW846 8270C
Chrysene	104	(43 - 124)	SW846 8270C
Fluorene	78	(51 - 120)	SW846 8270C
Indene	76	(49 - 108)	SW846 8270C
2-Methylnaphthalene	69	(47 - 138)	SW846 8270C
Naphthalene	77	(43 - 128)	SW846 8270C
Quinoline	73	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		110	$\overline{(30 - 160)}$
Fluorene d-10		60	(36 - 127)
Naphthalene-d8		76	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

#### LABORATORY CONTROL SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3C110158 Work Order #...: FJ6331AC Matrix...... WATER

LCS Lot-Sample#: D3C140000-349

 Prep Date.....:
 03/14/03
 Analysis Date..:
 03/26/03

 Prep Batch #...:
 3073349
 Analysis Time..:
 17:32

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo(e)pyrene	50.0	42.9	ug/L	86	SW846 8270C
Chrysene	50.0	51.8	ug/L	104	SW846 8270C
Fluorene	50.0	38.9	ug/L	78	SW846 8270C
Indene	50.0	37.8	ug/L	76	SW846 8270C
2-Methylnaphthalene	50.0	34.6	ug/L	69	SW846 8270C
Naphthalene	50.0	38.3	ug/L	77	SW846 8270C
Quinoline	50.0	36.4	ug/L	73	SW846 8270C

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	110	(30 - 160)
Fluorene d-10	60	(36 - 127)
Naphthalene-d8	76	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

# MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3C110158 Work Order #...: FJXAK1AC-MS Matrix...... WG

MS Lot-Sample #: D3C110158-001 FJXAK1AD-MSD

 Date Sampled...:
 03/10/03
 Date Received..:
 03/11/03

 Prep Date.....:
 03/14/03
 Analysis Date..:
 03/26/03

 Prep Batch #...:
 3073349
 Analysis Time..:
 18:48

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	82	(30 - 150)			SW846 8270C
	73	(30 - 150)	11	(0-30)	SW846 8270C
Chrysene	96	(43 - 124)			SW846 8270C
	87	(43 - 124)	11	(0-30)	SW846 8270C
Fluorene	98	(51 - 120)			SW846 8270C
	91	(51 - 120)	3.8	(0-30)	SW846 8270C
Indene	62	(49 - 108)			SW846 8270C
	71	(49 - 108)	6.3	(0-30)	SW846 8270C
2-Methylnaphthalene	98	(47 - 138)			SW846 8270C
	96	(47 - 138)	0.55	(0-30)	SW846 8270C
Naphthalene	216 a	(43 - 128)			SW846 8270C
	110	(43 - 128)	6.3	(0-30)	SW846 8270C
Quinoline	81	(40 - 126)			SW846 8270C
	78	(40 - 126)	4.0	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		104		(30 - 160)	<del>)</del>
		76		(30 - 160	))
Fluorene d-10		62		(36 - 127	7)
		61		(36 - 127	7)
Naphthalene-d8		67		(37 - 107	7)
		69		(37 - 107	7)

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results. Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

# MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3C110158 Work Order #...: FJXAK1AC-MS Matrix...... WG

MS Lot-Sample #: D3C110158-001 FJXAK1AD-MSD

 Date Sampled...:
 03/10/03
 Date Received..:
 03/11/03

 Prep Date....:
 03/14/03
 Analysis Date..:
 03/26/03

 Prep Batch #...:
 3073349
 Analysis Time..:
 18:48

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT			
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHO	
Benzo (e) pyrene	ND	47.6	38.8	ug/L	82		SW846	8270C
	ND	47.6	34.6	ug/L	73	11	SW846	8270C
Chrysene	ND	47.6	45.9	ug/L	96		SW846	8270C
	ND	47.6	41.3	ug/L	87	11	SW846	8270C
Fluorene	45	47.6	91.9	ug/L	98		SW846	8270C
	45	47.6	88.4	ug/L	91	3.8	SW846	8270C
Indene	33	47.6	62.6	ug/L	62		SW846	8270C
•	33	47.6	66.7	ug/L	71	6.3	SW846	8270C
2-Methylnaphthalene	140	47.6	182	ug/L	98		SW846	8270C
	140	47.6	181	ug/L	96	0.55	SW846	8270C
Naphthalene	720	47.6	818	ug/L	216 a		SW846	8270C
	720	47.6	768	ug/L	110	6.3	SW846	8270C
Quinoline	ND	47.6	38.5	ug/L	81		SW846	8270C
	ND	47.6	37.0	ug/L	78	4.0	SW846	8270C

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	104	(30 - 160)
	76	(30 - 160)
Fluorene d-10	62	(36 - 127)
	61	(36 - 127)
Naphthalene-d8	67	(37 - 107)
	69	(37 - 107)

# NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results. Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

# Cham of Custody Record

STL Denver 4955 Yarrow Street Arvada, CO 80002

DB 3/4/03



Severn Trent Laboratories, Inc.

STL-4124 (0700) DEN (0900)																							·	
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3752 WOODDALE AVENUE	22 WOODDALE AVENUE		924-1557 (9) Site Contact Lat				Lab Confact					, , ,		Analy	alysis (Attach list if					<u> </u>	T	_		
ST. LOUIS PARK, MN 55416	6	ی ا	SAME Carrier/Waybill Number								1 1		nore space is needed)						_					
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Contract/Purchase Order/Quote No.				Matri	ix			conta rese					000									Conditio	ons of Receipt	
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	1 1	Time	Air Aqueous	Sed.	Sour	Unpres.	H2S04	HNOS	ğ	NaOH	NBOH	7	0											
W420 -03/003 \$# 004	3-10-03	1:30	X			X						<u>\</u>	X											
W420D-031003	3-10-03	1:30	X			<u>x</u>			$\perp$		Ó	_	X										·- <u></u>	
W420M5-031003	3-10-03	1:30	×	_		X	Ц		_	$\perp$		~	X	Ш		Ш		$\perp$	_	_	Ш	·		
W420M5D-031003	3-10-03	1145	X	_		X		_	_	$\perp$	;	_	X				_		_					
W420 FB - 031003	3-10-03	1:45	X			X			4	$\perp$	_	~+	X	44		$\sqcup$	_	$\perp$		1	$\sqcup$			
W420 FBD -031003	3-10-03	1:45	X			X	Ш		_	$\perp$	_	~+	X	1			_	$\bot$						
W421-031003 @# 600/	3-10-03	1:50	X	!		X	Ш	$\perp$	$\downarrow$	$\perp$	į	2	X	$\perp \downarrow \downarrow$				$\perp$	↓					
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Turn Around Time Required  ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Day	Пета	ГП <b>а</b> и					QC F	Requi	rem	ents	(Spec	ify)												
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Comments																								



#### **DATA QUALITY ASSESSMENT**

STL Project # D3C110158 (A)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of five aqueous samples for part per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on March 10, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3C110158.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W420-031003 W420D-031003 W420FB-031003 W420FBD-031003 W421-031003

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### **DISCUSSION**

#### Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

# **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.2-4.6°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### Method Blanks

There was one method blank for this data package, batch 3073349. Target analytes were not detected in the laboratory method blank.

# **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses with the exception for those samples that required a dilution (W420-031003 and W420D-031003). The dilutions required for these samples precluded the quantitation of surrogates; therefore, no action was required.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample W420-031003. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for naphthalene was 216% for the MS sample. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Naphthalene	216/110	6.3	30-150/0-30

No action was taken since the concentration of naphthalene in the native sample was greater than 10x the spike amount.



# **Field Duplicate Results**

Samples W420-031003/W420D-031003 and W420FB-031003/W420FBD-031003 were submitted as the field duplicate samples with this data set. The RPD calculations for these samples were within the acceptable range for all detected analytes.

# **Quantitation Limits and Sample Results**

Some of the samples were analyzed using a dilution. W420-031003 and W420D-031003 were diluted by a factor of 10 for the compound 2,3 Dihydroindene and by a factor of 40 for Napthalene. Sample W421-031003 was diluted by a factor of 5 for the compounds Fluoranthene, Phenanthrene, and Pyrene. All reporting limits were adjusted accordingly.

All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

.



# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3C110160

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

**STL DENVER** 

Brian Stringer Project Manager

April 10, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Page
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> </ul>	
<ul> <li>Analytical Results</li> <li>QC Data Association Summary</li> <li>Chain-of-Custody</li> </ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
• Semivolatile GC/MS	
Volatile GC	
• Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
• Subcontracted Data	

# CASE NARRATIVE D3C110160

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

# Sample Receiving

Seven samples were received under chain of custody on March 11, 2003. The samples were received in good condition temperatures of 2.2°C, 3.6°C, 4.6°C, 2.7°C, 2.3°C and 2.4°C.

#### GC/MS Semivolatiles, SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2002 Quality Assurance Project Plan (QAPP) for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Sample D3C110160-005 demonstrated a recovery of the surrogate chrysene-d12 that was below control limits. Sample D3C110160-006 demonstrated recoveries of the surrogates chrysene-d12 and fluorene that were below control limits. There was insufficient sample volume available for either sample for re-extraction.

The LCS associated with batch 3073163 demonstrated a recovery for quinoline that was below control limits. Historical data shows that this compound typically has poor recoveries. There was insufficient sample volume available for re-extraction.

The MS/MSD performed on sample D3C110160-001 demonstrated recoveries that were below control limits for benzo(e)pyrene. The MS demonstrated an additional recovery that was below control limits for chrysene and the surrogate chrysene-d12. The relative percent difference was above control limits for benzo(e)pyrene and quinoline.

No other anomalies were observed.

# Data Completeness for Method 8270C SIM

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 95.4% completeness.

DATA COMPLETENESS CALCULATION				
	LOT: D3C110160			
ANALYSIS: PAHs by SW846-8270C SIM				
	1			
QC Parameter	Data	Valid Data		
	Planned	Obtained		
Method Blank	31	31		
MB Surrogates	3	3		
LCS	7	6		
LCS Surrogates	3	3		
FB/FBD	62	62		
MS	7	5		
MS Surrogates	3	2		
MSD	7	6		
MSD Surrogates	3	3		
MS/MSD RPD	7	5		
Sample/Dup. RPD	31	31		
Sample Surrogates	21	18		
Internal STD Area	33	33		
TOTAL	218	208		
% Completeness		95.4%		

<sup>\*</sup>A MS/MSD was performed on sample D3C110160-001.

# **Duplicate Calculation for Method 8270C SIM**

Sample Duplicate RPD Calculation Lot D3C110160					
0	204000	DUD OLO OLD	TD 004000		
Sample: GAC-SLP4T-		DUP: GAC-SLP4			DDD: 5004
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	ND	Acenaphthene	ND	0.0	! 
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	<del>,,,,,,</del>
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	<del></del>
Phenanthrene	ND	Phenanthrene	ND	0.0	·
Pyrene	ND	Pyrene	ND	0.0	······································
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample
p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3C110160

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
SLP6-031003 03/10/03 12:45 006				
Acenaphthene	59	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	10	4.8	ng/L	SW846 8270C SIM
Acridine	6.0 J	6.2	ng/L	SW846 8270C SIM
2,3-Dihydroindene	43	5.0	ng/L	SW846 8270C SIM
Fluorene	5.5	4.1	ng/L	SW846 8270C SIM
W48-031003 03/10/03 13:45 007				
Acenaphthene	68	5.7	ng/L	SW846 8270C SIM
Acridine	13	6.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	5.2	5.2	ng/L	SW846 8270C SIM
2,3-Dihydroindene	7.3	5.0	ng/L	SW846 8270C SIM
Indene	11	4.7	ng/L	SW846 8270C SIM
Pyrene	3.1 J	4.2	ng/L	SW846 8270C SIM

# **METHODS SUMMARY**

#### D3C110160

ANALYTICAL PREPARATION PARAMETER METHOD METHOD Base/Neutrals and Acids SW846 8270C SIM SW846 3520C

# References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

# D3C110160

ANALYTICAL		ANALYST
METHOD	ANALYST	ID
SW846 8270C SIM	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

#### D3C110160

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FJXCQ	001	GAC-SLP4T-031003	03/10/03	11:00
FJXCV	002	GAC-SLP4TD-031003	03/10/03	11:15
FJXCW	003	GAC-SLP4TFB-031003	03/10/03	12:00
FJXCX	004	GAC-SLP4TFBD-031003	03/10/03	12:15
FJXC2	005	GAC-SLP10T-031003	03/10/03	12:30
FJXC3	006	SLP6-031003	03/10/03	12:45
FJXC6	007	W48-031003	03/10/03	13:45

# NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: GAC-SLP4T-031003

# GC/MS Semivolatiles

TOL-Sample #: D3C110160+001 WOLK OIGEL #: FUXCOIAA MALLIX N	Lot-Sample #:	D3C110160-001	Work Order #: FJXCQ1AA	Matrix WG
---	---------------	---------------	------------------------	-----------

 Date Sampled...:
 03/10/03
 Date Received..:
 03/11/03

 Prep Date.....:
 03/15/03
 Analysis Date..:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time..:
 17:06

Dilution Factor: 1

Method....: SW846 8270C SIM

PARAMETER			REPORTING	
Acenaphthene ND 5.7 ng/L Acenaphthylene ND 4.8 ng/L Acridine ND 6.2 ng/L Anthracene ND 4.2 ng/L Anthracene ND 4.2 ng/L Benzo(a) anthracene ND 4.7 ng/L Benzo(b) fluoranthene ND 4.7 ng/L Benzo(k) fluoranthene ND 4.1 ng/L 2,3-Benzofuran ND 5.4 ng/L Benzo(ghi) perylene ND 6.2 ng/L Benzo(a) pyrene ND 6.2 ng/L Benzo(b) thiophene ND 5.5 ng/L Benzo(b) thiophene ND 5.6 ng/L Biphenyl ND 5.6 ng/L Carbazole ND 3.8 ng/L Chrysene ND 3.8 ng/L Dibenzo(a, h) anthracene ND 5.9 ng/L Dibenzofuran ND 5.7 ng/L Dibenzothiophene ND 5.7 ng/L Dibenzothiophene ND 5.0 ng/L L J.3-Dihydroindene ND 5.0 ng/L Indene ND 4.6 ng/L Indene ND 4.7 ng/L Indene ND 4.7 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 4.7 ng/L Indene ND 5.9 ng/L Indene ND 4.7 ng/L Indene ND 5.9 ng/L	PARAMETER	RESULT		UNITS
Acenaphthylene ND 4.8 ng/L Acridine ND 6.2 ng/L Anthracene ND 4.2 ng/L Benzo(a) anthracene ND 4.2 ng/L Benzo(b) fluoranthene ND 4.7 ng/L Benzo(b) fluoranthene ND 4.1 ng/L 2,3-Benzofuran ND 5.4 ng/L Benzo(ghi) perylene ND 5.4 ng/L Benzo(a) pyrene ND 6.2 ng/L Benzo(a) pyrene ND 4.3 ng/L Benzo(b) thiophene ND 5.6 ng/L Biphenyl ND 5.6 ng/L Biphenzo(a, h) anthracene ND 5.7 ng/L Dibenzo(a, h) anthracene ND 5.7 ng/L Dibenzofuran ND 5.0 ng/L Thurshene ND 4.1 ng/L ND 1.1 ng/L ND 1.1 ng/L ND 1.1 ng/L ND 1.2 ng/L ND 1.2 ng/L ND 1.2 ng/L ND 1.2 ng/L ND 1.3 ng/L ND 1.2 ng/L ND 1.3 ng/L N				
Acridine  Anthracene  Anthracene  ND  Anthracene  ND  Anthracene  ND  Acridine  ND  Acridine  Acridine  Acridine  Acridine  ND  Acridine  Acridine  Acridine  Acridine  Acridine  Acridine  ND  Acridine  Acri	<del>-</del>			<del>-</del> ·
Anthracene  Benzo(a) anthracene  Benzo(b) fluoranthene  Benzo(k) fluoranthene  Benzo(k) fluoranthene  ND  4.7 ng/L  Benzo(k) fluoranthene  ND  4.1 ng/L  2,3-Benzofuran  ND  5.4 ng/L  Benzo(ghi) perylene  ND  6.2 ng/L  Benzo(e) pyrene  ND  4.3 ng/L  Benzo(b) thiophene  ND  5.6 ng/L  Biphenyl  ND  5.6 ng/L  Carbazole  ND  3.8 ng/L  Chrysene  ND  5.6 ng/L  Dibenzo(a, h) anthracene  ND  Dibenzofuran  ND  5.7 ng/L  Dibenzofuran  ND  5.7 ng/L  Dibenzofuran  ND  5.0 ng/L  Fluoranthene  ND  A.1 ng/L  Fluorene  ND  A.6 ng/L  Fluorene  ND  A.7 ng/L  Indene  Inde	_ <del>_</del>			<del>-</del> '
Benzo(a) anthracene				
Benzo (b) fluoranthene				_
Benzo (k) fluoranthene				-
2,3-Benzofuran	• • • • • • • • • • • • • • • • • • • •			-
Benzo (ghi) perylene		ND		_
Benzo(a) pyrene   ND   2.5   ng/L	Benzo(ghi)pervlene	ND	6.2	•
Benzo(e) pyrene   ND		ND	2.5	•
Benzo (b) thiophene	<del>=</del> =	ND		-
Biphenyl         ND         5.6         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzothiophene         ND         5.7         ng/L           Dibenzothiophene         ND         4.1         ng/L           2,3-Dihydroindene         ND         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         ND         4.1         ng/L           Indene         ND         4.7         ng/L           Indene         ND         4.7         ng/L           Indene         ND         5.4         ng/L           Indene         ND         4.7         ng/L           Indene         ND         5.4         ng/L           Indene         ND         4.7         ng/L           Indene         ND         5.6         ng/L           Indene         ND         5.6         ng/L           Indene         ND         5.6         ng/L           Naphthalene         ND         8		ND	5.2	<del>-</del> -
Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         ND         4.1         ng/L           2,3-Dihydroindene         ND         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         ND         4.1         ng/L           Indene         ND         4.7         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           Indole         ND         4.7         ng/L           Indole         ND         5.9         ng/L           Naphthalene         ND         5.6         ng/L           Naphthalene         ND         3.3         ng/L           Perylene         ND         6.3         ng/L           Phenanthrene         ND         4.2         ng/L           Quinoline		ND	5.6	<del>-</del> ·
Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         ND         4.1         ng/L           2,3-Dihydroindene         ND         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         ND         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indono (1,2,3-cd) pyrene         ND         4.7         ng/L           Indono (1,2,3-cd) pyrene         ND         5.9         ng/L           Indono (1,2,3-cd) pyrene         ND         4.7         ng/L           Indono (1,2,3-cd) pyrene         ND         5.9         ng/L           Indono (1,2,3-cd) pyrene         ND         5.6         ng/L           NB type         ND         5.6         ng/L           NB type         ND         5.6         ng/L           Naphthalene         ND         3.3         ng/L           Phenanthrene         ND		ND	3.8	_
Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         ND         4.1         ng/L           2,3-Dihydroindene         ND         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         ND         4.1         ng/L           Indene         ND         4.7         ng/L           Indene (1,2,3-cd) pyrene         ND         5.4         ng/L           Indene (1,2,3-cd) pyrene         ND         4.7         ng/L           Indene (1,2,3-cd) pyrene         ND         5.4         ng/L           Indene (1,2,3-cd) pyrene         ND         4.7         ng/L           Indene (1,2,3-cd) pyrene         ND         5.9         ng/L           Indene (1,2,3-cd) pyrene         ND         5.9         ng/L           Indene (1,2,3-cd) pyrene         ND         5.9         ng/L           Indene (1,2,3-cd) pyrene         ND         5.6         ng/L           Indene (1,2,3-cd) pyrene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L	Chrysene			
Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         ND         4.1         ng/L           2,3-Dihydroindene         ND         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         ND         4.1         ng/L           Indene         ND         4.7         ng/L           Indene (1,2,3-cd) pyrene         ND         5.4         ng/L           Indeno (1,2,3-cd) pyrene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.6         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.6         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.6         ng/L           Nathylander         ND         8.6         ng/L           Nathylander         ND         8.6         ng/L           Perylene				_
Dibenzothiophene         ND         4.1         ng/L           2,3-Dihydroindene         ND         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         ND         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indeno (1,2,3-cd) pyrene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.9         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.6         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.6         ng/L           National pyrene         ND         8.6         ng/L           National pyrene         ND         8.6         ng/L				
2,3-Dihydroindene       ND       5.0       ng/L         Fluoranthene       ND       4.6       ng/L         Fluorene       ND       4.1       ng/L         Indene       ND       4.7       ng/L         Indeno(1,2,3-cd)pyrene       ND       5.4       ng/L         Indeno(1,2,3-cd)pyrene       ND       4.7       ng/L         Indeno(1,2,3-cd)pyrene       ND       4.7       ng/L         Indeno(1,2,3-cd)pyrene       ND       5.4       ng/L         Indeno(1,2,3-cd)pyrene       ND       4.7       ng/L         Indeno(1,2,3-cd)pyrene       ND       5.4       ng/L         Indeno(1,2,3-cd)pyrene       ND       5.4       ng/L         Indeno(1,2,3-cd)pyrene       ND       5.9       ng/L         Indeno(1,2,3-cd)pyrene       ND       8.6       ng/L         Indeno(1	Dibenzothiophene			_
Fluoranthene		ND	5.0	_
Fluorene	<del>-</del>	ND	4.6	
Indene	Fluorene	ND	4.1	_
Indeno(1,2,3-cd)pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L           Quinoline         ND         9.0         ng/L           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)	Indene	ND	4.7	
Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L           Quinoline         ND         9.0         ng/L           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)	Indeno(1,2,3-cd)pyrene	ND	5.4	<del>-</del>
2-Methylnaphthalene       ND       5.9       ng/L         1-Methylnaphthalene       ND       5.6       ng/L         Naphthalene       ND       8.6       ng/L         Perylene       ND       3.3       ng/L         Phenanthrene       ND       6.3       ng/L         Pyrene       ND       4.2       ng/L         Quinoline       ND       9.0       ng/L         PERCENT       RECOVERY         SURROGATE       RECOVERY       LIMITS         Chrysene-d12       49       (30 - 118)         Fluorene d-10       58       (41 - 162)		ND	4.7	
1-Methylnaphthalene ND 5.6 ng/L Naphthalene ND 8.6 ng/L Perylene ND 3.3 ng/L Phenanthrene ND 6.3 ng/L Pyrene ND 4.2 ng/L Quinoline ND 9.0 ng/L  PERCENT RECOVERY SURROGATE RECOVERY LIMITS Chrysene-d12 49 (30 - 118) Fluorene d-10 58 (41 - 162)	2-Methylnaphthalene	ND	5.9	
Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L           Quinoline         ND         9.0         ng/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)		ŅD	5.6	_
Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L           Quinoline         ND         9.0         ng/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)		ND	8.6	_
Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L           Quinoline         ND         9.0         ng/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)	<del>-</del>	ND	3.3	-
Pyrene         ND         4.2         ng/L           Quinoline         ND         9.0         ng/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-dl2         49         (30 - 118)           Fluorene d-10         58         (41 - 162)	Phenanthrene	ND	6.3	
Quinoline         ND         9.0         ng/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)	Pyrene	ND	4.2	
SURROGATE         RECOVERY           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)	Quinoline	ND	9.0	-
SURROGATE         RECOVERY         LIMITS           Chrysene-d12         49         (30 - 118)           Fluorene d-10         58         (41 - 162)				<b>J</b> .
Chrysene-dl2 49 (30 - 118) Fluorene d-10 58 (41 - 162)		PERCENT	RECOVERY	
Fluorene d-10 58 (41 - 162)	SURROGATE	RECOVERY	LIMITS	
	Chrysene-d12	49	(30 - 118)	•
	Fluorene d-10	58	(41 - 162)	
Naphthalene-d8 65 (30 - 108)	Naphthalene-d8	65	(30 - 108)	

# Client Sample ID: GAC-SLP4TD-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110160-002	Work Order #: FJXCV1AA	Matrix WG
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 Date Sampled...:
 03/10/03
 Date Received..:
 03/11/03

 Prep Date....:
 03/15/03
 Analysis Date..:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time..:
 19:00

Dilution Factor: 1

Method....: SW846 8270C SIM

REPORTING   LIMIT   UNITS
ND
Company   Comp
ND
Inthracene         ND         4.2         ng/L           Ienzo (a) anthracene         ND         4.3         ng/L           Ienzo (b) fluoranthene         ND         4.7         ng/L           Ienzo (k) fluoranthene         ND         4.1         ng/L           Ienzo (k) fluoranthene         ND         5.4         ng/L           Ienzo (ghi) perylene         ND         5.4         ng/L           Ienzo (ghi) perylene         ND         2.5         ng/L           Ienzo (e) pyrene         ND         4.3         ng/L           Ienzo (b) thiophene         ND         5.2         ng/L           Ienzo (b) thiophene         ND         5.6         ng/L           Ienzo (b) thiophene         ND         3.8         ng/L           Ienzo (b) thiophene         ND         3.8         ng/L           Ienzo (b) thiophene         ND         3.8         ng/L           Ienzo (c) pyrene         ND         3.8         ng/L           Ienzo (c) pyrene         ND         3.8         ng/L           Ienzo (b) thiophene         ND         3.8         ng/L           Ienzo (c) pyrene         ND         3.8         ng/L           Ienzo (c)
Henzo (a) anthracene         ND         4.3         ng/L           Henzo (b) fluoranthene         ND         4.7         ng/L           Henzo (k) fluoranthene         ND         4.1         ng/L           Henzo (k) fluoranthene         ND         5.4         ng/L           J. 3-Benzofuran         ND         5.4         ng/L           Henzo (ghi) perylene         ND         6.2         ng/L           Henzo (a) pyrene         ND         4.3         ng/L           Henzo (b) thiophene         ND         5.2         ng/L           Henzo (b) thiophene         ND         5.6         ng/L           Henzo (b) thiophene         ND         3.8         ng/L           Henzo (c) pyrene         ND         3.8         ng/L           Henzo (b) thiophene         ND         3.8         ng/L           Henzo (c) pyrene         ND         3.8         ng/L           Henzo (c) pyrene         ND         3.8         ng/L           Henzo
denzo (b) fluoranthene         ND         4.7         ng/L           denzo (k) fluoranthene         ND         4.1         ng/L           denzo (ghi) perylene         ND         5.4         ng/L           denzo (ghi) perylene         ND         6.2         ng/L           denzo (a) pyrene         ND         2.5         ng/L           denzo (e) pyrene         ND         4.3         ng/L           denzo (b) thiophene         ND         5.2         ng/L           diphenyl         ND         5.6         ng/L           drapacole         ND         3.8         ng/L           drapacole         ND         3.8         ng/L           drapacole         ND         5.6         ng/L           drapacole         ND         5.6         ng/L           drapacole         ND         5.6         ng/L           drapacole         ND         5.7         ng/L           drapacole         ND         5.7         ng/L           drapacole         ND         4.1         ng/L           drapacole         ND         4.1         ng/L           drapacole         ND         5.0         ng/L
denzo (k) fluoranthene       ND       4.1       ng/L         4,3-Benzofuran       ND       5.4       ng/L         4 enzo (ghi) perylene       ND       6.2       ng/L         4 enzo (a) pyrene       ND       2.5       ng/L         4 enzo (e) pyrene       ND       4.3       ng/L         4 enzo (b) thiophene       ND       5.2       ng/L         4 enzo (b) thiophene       ND       5.6       ng/L         4 enzo (e) pyrene       ND       5.6       ng/L         4 enzo (b) thiophene       ND       5.6       ng/L         4 enzo (b) thiophene       ND       3.8       ng/L         4 enzo (a) h) anthracene       ND       5.6       ng/L         4 enzo (a, h) anthracene       ND       5.7       ng/L         4 enzo (a) h) anthracene       ND       5.7       ng/L         4 enzo (a) h) anthracene       ND       5.0       ng/L         4 enzo (a) h) anthracene       ND       5.0       ng/L
Senzo (ghi) perylene
denzo (a) pyrene         ND         2.5         ng/L           denzo (e) pyrene         ND         4.3         ng/L           denzo (b) thiophene         ND         5.2         ng/L           denzo (b) thiophene         ND         5.6         ng/L           denzo (b) thiophene         ND         5.6         ng/L           denzo (b) thiophene         ND         3.8         ng/L           denzo (a) thiophene         ND         5.6         ng/L           denzo (a, h) anthracene         ND         5.7         ng/L           denzo (a, h) anthracene         ND         4.1         ng/L           denzo (a, h) anthracene         ND         5.7         ng/L           denzo (a, h) anthracene         ND         4.1         ng/L           denzo (a, h) anthracene         ND         5.0         ng/L           denzo (a, h) anthracene         ND         4.1         ng/L           denzo (a, h) anthracene         ND         5.0         ng/L
denzo (e) pyrene         ND         4.3         ng/L           denzo (b) thiophene         ND         5.2         ng/L           diphenyl         ND         5.6         ng/L           darbazole         ND         3.8         ng/L           dhrysene         ND         5.6         ng/L           dibenzo (a, h) anthracene         ND         5.9         ng/L           dibenzo furan         ND         5.7         ng/L           dibenzo thiophene         ND         4.1         ng/L           dibenzo thiophene         ND         5.0         ng/L           duoranthene         ND         4.6         ng/L
Henzo (b) thiophene         ND         5.2         ng/L           Liphenyl         ND         5.6         ng/L           Larbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Libenzo (a, h) anthracene         ND         5.9         ng/L           Libenzo furan         ND         5.7         ng/L           Libenzo thiophene         ND         4.1         ng/L           Jabenzo thiophene         ND         5.0         ng/L           Luoranthene         ND         4.6         ng/L
diphenyl         ND         5.6         ng/L           darbazole         ND         3.8         ng/L           drysene         ND         5.6         ng/L           dibenzo(a,h) anthracene         ND         5.9         ng/L           dibenzofuran         ND         5.7         ng/L           dibenzothiophene         ND         4.1         ng/L           dibenzothiophene         ND         5.0         ng/L           duoranthene         ND         4.6         ng/L
darbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo(a,h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         ND         4.1         ng/L           Ja-Dihydroindene         ND         5.0         ng/L           Cluoranthene         ND         4.6         ng/L
Intrysene         ND         5.6         ng/L           Sibenzo(a,h) anthracene         ND         5.9         ng/L           Sibenzofuran         ND         5.7         ng/L           Sibenzothiophene         ND         4.1         ng/L           ,3-Dihydroindene         ND         5.0         ng/L           Tuoranthene         ND         4.6         ng/L
dibenzo (a,h) anthracene         ND         5.9         ng/L           dibenzofuran         ND         5.7         ng/L           dibenzothiophene         ND         4.1         ng/L           ,3-Dihydroindene         ND         5.0         ng/L           duoranthene         ND         4.6         ng/L
dibenzofuran         ND         5.7         ng/L           dibenzothiophene         ND         4.1         ng/L           ,3-Dihydroindene         ND         5.0         ng/L           duoranthene         ND         4.6         ng/L
dibenzothiophene         ND         4.1         ng/L           ,3-Dihydroindene         ND         5.0         ng/L           duoranthene         ND         4.6         ng/L
,3-Dihydroindene ND 5.0 ng/L luoranthene ND 4.6 ng/L
Tuoranthene ND 4.6 ng/L
<del>-</del>
Tuorene ND 4.1 ng/L
ndene ND 4.7 ng/L
ndeno(1,2,3-cd)pyrene ND 5.4 ng/L
ndole ND 4.7 ng/L
-Methylnaphthalene ND 5.9 ng/L
-Methylnaphthalene ND 5.6 ng/L
aphthalene ND 8.6 ng/L
erylene ND 3.3 ng/L
henanthrene ND 6.3 ng/L
yrene ND 4.2 ng/L
uinoline ND 9.0 ng/L
PERCENT RECOVERY
URROGATE RECOVERY LIMITS
hrysene-d12 34 (30 - 118)
luorene d-10 46 (41 - 162)
aphthalene-d8 53 (30 - 108)

# Client Sample ID: GAC-SLP4TFB-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110160-003	Work Order #: FJXCW1AA	Matrix: WG
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 Date Sampled...:
 03/10/03
 Date Received..:
 03/11/03

 Prep Date.....:
 03/15/03
 Analysis Date..:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time..:
 19:38

Dilution Factor: 1

Method.....: SW846 8270C SIM

	Method	: SW846 82	70C SIM
		REPORTING	<b>3</b>
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND ·	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	53	(30 - 118	3)
Fluorene d-10	44	(41 - 162	
Naphthalene-d8	59	(30 - 108	

414

# Client Sample ID: GAC-SLP4TFBD-031003

# GC/MS Semivolatiles

Lot-Sample #: D3	3C110160-004	Work Order #:	FJXCX1AA	Matrix WG
Date Sampled: 03	3/10/03	Date Received:	03/11/03	

 Prep Date....:
 03/15/03
 Analysis Date..:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time..:
 20:16

Dilution Factor: 1

Method.....: SW846 8270C SIM

	Method	C SIM	
PARAMETER	RESULT	REPORTING	INITE
Acenaphthene	ND	<u>LIMIT</u> 5.7	UNITS ng/L
Acenaphthene Acenaphthylene	ND	4.8	
Acridine	ND		ng/L
Acridine Anthracene	ND ND	6.2	ng/L
<del></del>	ND ND	4.2	ng/L
Benzo (a) anthracene		4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND 	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ИD	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5. <b>2</b>	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	57	(30 - 118)	•
Fluorene d-10	42	(41 - 162)	
Naphthalene-d8	56	(30 - 108)	

# Client Sample ID: GAC-SLP10T-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110160-005	Work Order #: FJXC21AA	Matrix WG
Date Sampled: 03/10/03	Date Received: 03/11/03	
Prep Date: 03/15/03	Analysis Date: 04/07/03	

Prep Batch #...: 3073163 Analysis Time..: 20:54

Dilution Factor: 1

Method.....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ИD	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND .	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	25 *	(30 - 118	<del>-</del>
Fluorene d-10	43	(41 - 162	
•	43 55	(30 - 108	•
Naphthalene-d8	22	(20 - 108	)

# \* Surrogate recovery is outside stated control limits.

# Client Sample ID: SLP6-031003

# GC/MS Semivolatiles

		,	
Lot-Sample #: D3C110160-006	Work Order #:	FJXC31AA	<b>Matrix</b> : WG
Date Sampled: 03/10/03	Date Received:	03/11/03	
Prep Date: 03/15/03	Analysis Date:	04/07/03	
Prep Batch #: 3073163	Analysis Time:	21:32	
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
		DEDODMINA	,
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	5 <b>9</b>	5.7	ng/L
Acenaphthylene	10	4.8	ng/L
Acridine	6.0 J	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo (b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	43	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	5.5	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	17 *	(30 - 118)	•
Fluorene d-10	37 *	(41 - 162)	
Naphthalene-d8	43	(30 - 108)	
naphenatene au	<del>-</del> 3	(20 - 100)	

# NOTE(S):

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W48-031003

# GC/MS Semivolatiles

Lot-Sample #: D3C110160-007	Work Order #: FJXC61AA	Matrix WG
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 Date Sampled...:
 03/10/03
 Date Received...:
 03/11/03

 Prep Date.....:
 03/15/03
 Analysis Date...:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time...:
 22:09

Dilution Factor: 1

Method.....: SW846 8270C SIM

		REPORTIN	īG
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	68	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	13	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	5.2	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	7.3	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	11	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	3.1 J	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	33	(30 - 11	8)
Fluorene d-10	77	(41 - 16	2)
Naphthalene-d8	45	(30 - 10	8)

# NOTE (S):

J Estimated result. Result is less than RL.

# QC DATA ASSOCIATION SUMMARY

# D3C110160

# Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3073163	3073053
002	WG	SW846 8270C SIM		3073163	3073053
003	WG	SW846 8270C SIM		3073163	3073053
004	WG	SW846 8270C SIM		3073163	3073053
005	WG	SW846 8270C SIM		3073163	3073053
006	WG	SW846 8270C SIM		3073163	3073053
007	WG	SW846 8270C SIM		3073163	3073053

# METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3C110160 Work Order #...: FJ5V71AA Matrix.....: WATER

MB Lot-Sample #: D3C140000-163

Prep Date....: 03/15/03 Analysis Time..: 15:50

Analysis Date..: 04/07/03 Prep Batch #...: 3073163

Dilution Factor: 1

		REPORTING	}	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo (ghi) perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo (a) pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
Chrysene	ND	5.6	ng/L	SW846 8270C SIM
Dibenzo (a, h) anthracene	ND .	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY		•
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	57	(30 - 118	)	
Fluorene d-10	47	(41 - 162	)	
Naphthalene-d8	60	(30 - 108	)	

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3C110160 Work Order #...: FJ5V71AC Matrix.....: WATER

LCS Lot-Sample#: D3C140000-163

 Prep Date.....:
 03/15/03
 Analysis Date..:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time..:
 16:28

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	31	(30 - 150)	SW846 8270C SIM
Chrysene	49	(30 - 132)	SW846 8270C SIM
Fluorene	62	(30 - 132)	SW846 8270C SIM
Indene	65	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	67	(30 - 150)	SW846 8270C SIM
Naphthalene	76	(30 - 150)	SW846 8270C SIM
Quinoline	29 a	(30 - 150)	SW846 8270C SIM
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		60	(30 - 118)
Fluorene d-10		53	(41 - 162)
Naphthalene-d8		74	(30 - 108)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

# LABORATORY CONTROL SAMPLE DATA REPORT

# GC/MS Semivolatiles

Client Lot #...: D3C110160 Work Order #...: FJ5V71AC Matrix.....: WATER

LCS Lot-Sample#: D3C140000-163

Prep Date....: 03/15/03 Analysis Date..: 04/07/03 Prep Batch #...: 3073163 Analysis Time..: 16:28

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER			INTERC	RECOVERY	METHOD
	AMOUNT	AMOUNT	UNITS	RECOVERI	
Benzo (e) pyrene	10.0	3.10	ng/L	31	SW846 B270C S
Chrysene	10.0	4.90	ng/L	49	SW846 8270C S
Pluorene	10.0	6.24	ng/L	62	SW846 8270C S
Indene	10.0	6.53	ng/L	65	SW846 8270C S
2-Methylnaphthalene	10.0	6.74	ng/L	67	SW846 8270C S
Naphthalene	10.0	7.63	ng/L	76	SW846 8270C S
Quinoline	10.0	a	ng/L	29	SW846 8270C S
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS	_	
Chrysene-d12		60	(30 - 118)	<del>-</del>	,
Fluorene d-10		53	(41 - 162)	)	
Naphthalene-d8		74	(30 - 108)	)	•

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

# MATRIX SPIKE SAMPLE EVALUATION REPORT

# GC/MS Semivolatiles

Client Lot #: D3C110160	Work Order #: H	FJXCO1AC~MS	Matrix WG
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MS Lot-Sample #: D3C110160-001 FJXCQ1AD-MSD

 Date Sampled...:
 03/10/03
 Date Received...:
 03/11/03

 Prep Date.....:
 03/15/03
 Analysis Date...:
 04/07/03

 Prep Batch #...:
 3073163
 Analysis Time...:
 17:44

Dilution Factor: 1

	PERCENT	RECOVERY		RPD							
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD						
Benzo(e)pyrene	0.0 a	(30 - 150)			SW846 8270C SIM						
	15 a,p	(30 - 150)	200	(0-50)	SW846 8270C SIM						
Chrysene	21 a	(30 - 132)			SW846 8270C SIM						
	34	(30 - 132)	40	(0-50)	SW846 8270C SIM						
Pluorene	<b>4</b> 7	(30 - 132)			SW846 8270C SIM						
	55	(30 - 132)	8.3	(0-50)	SW846 8270C SIM						
Indene	50	(30 - 150)			SW846 8270C SIM						
	57	(30 - 150)	5.2	(0-50)	SW846 8270C SIM						
2-Methylnaphthalene	54	(30 - 150)			SW846 8270C SIM						
	64	(30 - <b>150</b> )	8.6	(0-50)	SW846 8270C SIM						
Naphthalene	63	(30 - 150)			SW846 8270C SIM						
	76	(30 - 150)	12	(0-50)	SW846 8270C SIM						
Quinoline	39	(30 - 150)			SW846 8270C SIM						
	73 p	(30 - 150)	53	(0-50)	SW846 8270C SIM						
		PERCENT		RECOVERY							
SURROGATE		RECOVERY		LIMITS							
Chrysene-d12		24 *		(30 - 118	<u>)</u>						
		39		(30 - 118	)						
Fluorene d-10		42		(41 - 162	)						
		47		(41 ~ 162	)						
Naphthalene-d8		52		(30 - 108	)						
		60		(30 ~ 108	)						

#### NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results. Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

<sup>\*</sup> Surrogate recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

# GC/MS Semivolatiles

Client Lot #...: D3C110160 Work Order #...: FJXCQ1AC-MS Matrix...... WG

MS Lot-Sample #: D3C110160-001 FJXCQ1AD-MSD

 Date Sampled...:
 03/10/03
 Date Received...:
 03/11/03

 Prep Date.....:
 03/15/03
 Analysis Date...:
 04/07/03

Prep Batch #...: 3073163 Analysis Time..: 17:44

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT										
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD								
Benzo (e) pyrene	ND	10.7	0.0	ng/L	0.0 a		SW846 8270C SIM								
	ND	9.89	1.52	ng/L	15 a,p	200	SW846 8270C SIM								
Chrysene	NID	10.7		ոց/L	21 a		SW846 8270C SIM								
	NID	9.89	3.33	ng/L	34	40	SW846 8270C SIM								
Fluorene	ND	10.7	5.04	ng/L	47		SW846 8270C SIM								
	ND	9.89	5.47	ng/L	55	8.3	SW846 8270C SIM								
Indene	ND	10.7	5.38	ng/L	50		SW846 8270C SIM								
	ND	9.89	5.67	ng/L	57	5.2	SW846 8270C SIM								
2-Methylnaphthalene	ND	10.7	5.81	ng/L	54		SW846 8270C SIM								
	ND	9.89	6.33	ng/L	64	8.6	SW846 8270C SIM								
Naphthalene	ND	10.7	6.72	ng/L	63		SW846 8270C SIM								
	ND	9.89	7.55	ng/L	76	12	SW846 8270C SIM								
Quinoline	ND	10.7	4.18	ng/L	39		SW846 8270C SIM								
	ND	9.89	7.23	ng/L	73 p	53	SW846 8270C SIM								
		Pl	ERCENT		RECOVERY										
SURROGATE		RI	ECOVERY		LIMITS										
34.5					70.0										

	PERCENT	RECOVERY					
SURROGATE	RECOVERY	LIMITS					
Chrysene-d12	24 *	(30 - 118)					
	39	(30 - 118)					
Fluorene d-10	42	(41 - 162)					
	47	(41 - 162)					
Naphthalene-d8	52	(30 ~ 108)					
	60	(30 - 108)					

# NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

 $<sup>\</sup>boldsymbol{p}$  . Relative percent difference (RPD) is outside stated control limits.

<sup>·</sup> Surrogate recovery is outside stated control limits.



~ ¥11/03



# Services Severn Trent Laboratories, Inc.

STL-4124 (0901)																							
Client CLTV OF OT 1 CLUB DADIC		1 '	Project Manager								Date					Chain of Custody Number							
CITY OF ST. LOUIS PARK		Telephone Number (Area Code)/Fax					<u>/c-</u>	<u>R.</u>	50	r]	<u> </u>			,		3-10-03					<u> </u>	<u> </u>	
OTILITY DIVISION			1											<b></b>		Lab Number				Page		_	
3752 WOODDALE AVENUE					b Co		_2	924-2570						Analysis (Attach list if						of			
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Project Name and Location (State)		SAME Carrier/Waybill Number																					
SAME		FEN EX80			ه مکا	682412303										1	1 1	Sp	ecial	Instructio	ns/		
Contract/Purchase Order/Quote No.			Matrix			Containers & Preservatives					2							Col	nditio	ns of Rec	eipt		
Sample I.D. No, and Description (Containers for each sample may be combined on one line)	Date	Time	Ak	Aqueous	Soil S	Unores	H2504	HNO3	HC!	NBOH	ZnAc/ NaOH		200										
BAB-56 P47-031003	3-10-03	11:00		X		X						6	X							PP	T's		
BAC-51947 D-03/003	3-10-03	11:15	_	X		1	4-					6	X	_			$\perp \perp$			PP	2 - 2	<u> </u>	
BAC-SLP4TM5-031000.	3-10-03 1	1:30		2		<u> </u>	Ĺ					6	X							pp	T 5		
GAC-52P4TMSD-031003 :	3-10-03 1	1:45		X,		\ \ \ \ \ \	仜					6	X				$\perp \perp$			PF	6	;	
BAC-52P4TM50-031043; BAC-52P4TFB-0310033	-10-03 1	2:00		K		<u>\</u>	1					6	X							pp	<u>7 5</u>	•	
GAR-54P4TFBD+03/003 3	-10-05	2:15		X_		X	_					6	X							PPZ	7.5	•	
GAC-54P4TFBD-031003 3 BAC-54P10T-031003 3	-10-05 1	2:30		X		<u> </u> \	4—					6	x							PP	<u> 75</u>	•	
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Possible Hazard Identification					Disposal				$\Box$														
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Turn Around Time Required											(Spe	city,	)										
24 Hours 48 Hours 7 Days 14 Days 1. Relinquished By	21 Days	Otn	er				4							·/ /									
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Comments						-	.1	-												.1		<del></del>	

# Chain of Custody Record



# Services Severn Trent Laboratories, Inc.

STL-4124 (0901)												٠.																
Client		Project M															[	ate			1 ~	7	(	Chain	of Custod	Number		
City of St. Louis Park		Scott AnderScon Telephone Number (Area Code)/Fax Number											3/10/05			$\perp$	<u> 150740</u>											
Address()		Telephon	e Nu	ımber	(Area	Code	e)/Fax	( Nun	nber							1	Lab Number					1		1				
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City State Zip Code	, i	Site Cont					Lab	Cont	act	٠, .			l			, T	knaly: lore s	sis (A Inace	is n	h list eede	if d)			ŀ				
St. Louis Park MW 554				re		<u> </u>	Dri	an	_ 5	m	4	41	_	. T	Т	Ť	T		Ĩ	T	Ť			7				
Project Name and Location (State)		Carrier/M	ayo	III NUM	Der≪	•					•			S	-				- 1						_			
Contract/Purchase Order/Quote No.								-																1	Specia	al Instru ions of	ictions/	
Commacy-uranase Order/Gubie No.		Matrix							F											Condit	บกร บา	песыр						
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date T	ime	į.	Aqueous	No.		Unpres.	H2SO4	HNO3	Ş.	VaOH	\$ \$ \$ \$ \$ \$ \$		MH														
W48-031003 5001 3	/10/03 13			χÌ	"		6					1		X		1				1	1							_
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24 Hours 48 Hours 7 Days 14 Days	21 Days	☐ Othe	r				_								1													
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#### **DATA QUALITY ASSESSMENT**

STL Project # D3C110160 (B)

July 1, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of seven aqueous samples for parts per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on March 10, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3C110160.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

GAC-SLP4T-031003 GAC-SLP4TD-031003 GAC-SLP4TFB-031003 GAC-SLP4TFBD-031003 GAC-SLP10T-031003 SLP6-031003 W48-031003

### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results



Quantitation limits and sample results

#### DISCUSSION

#### Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.2-4.6°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3073163. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses except for samples GAC-SLP10T-031003 and SLP6-031003. The recoveries for chrysene-d12 were at 25% and 17% respectively. SLP6-031003 had a recovery of 37% for fluorene-d10. The QAPP limits for these two compounds are 30% and 41%.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses except for quinoline. This compound had a 29% recovery. The QAPP limits are 30%.

#### MS/MSD Results

MS/MSD analyses were performed on sample GAC-SLP4T-031003. The following table summarizes the percent recoveries and/or the relative percent difference (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for benzo(e)pyrene was 0% for the MS sample and 15% for the MSD. The RPD for benzo(e)pyrene was 200. Chrysene and quinoline had percent recoveries outside the QC limits and the RPD for quinoline was 53 with a limit of 50. All other recoveries and RPDs were within the acceptable range.



Compound	%R MS/MSD	RPD (%)	MS-MSD/(RPD QC Limits)
Benzo(e)pyrene	0/15	200	30-150/(0-50)
Chrysene	21/ok	ok	30-132/(0-50)
Quinoline	ok/73	53	30-150/(0-50)

# **Field Duplicate Results**

Sample GAC-SLP4T-031003 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for all detected analytes.

## **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

There were three SQLs that exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

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# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E060273

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer
Project Manager

May 23, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul><li>Table of Contents</li><li>Case Narrative</li></ul>	
<ul> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> </ul>	
<ul> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> <li>Analytical Results</li> </ul>	
<ul> <li>QC Data Association Summary</li> <li>QC Sample Results</li> </ul>	
Chain-of-Custody	Oh sala halassi sehasi
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).	Check below when supporting documentation is present.
Volatile GC/MS	
6	
• Semivolatile GC/MS	
Volatile GC	
• Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
Subcontracted Data	

## CASE NARRATIVE D3E060273

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

### Sample Receiving

Four samples were received under chain of custody on May 6, 2003. The samples were received in good condition at a temperature of 2.7°C.

## GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The MS/MSD was performed on a sample from another client and/or lot and was in control.

No anomalies were observed.

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# **Data Completeness for Method 8270C**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 100% completeness.

DATA COMPLETENESS CALCULATION								
LOT: D3E060273								
	PAHs by SW	/846-8270C						
	1021007	1						
QC Parameter	Data	Valid Data						
	Planned	Obtained						
Method Blank	31	31						
MB Surrogates	3	3						
LCS	7	7						
LCS Surrogates	3	3						
FB/FBD	NA	NA						
MS	NA	NA						
MS Surrogates	NA	NA						
MSD	NA	NA						
MSD Surrogates	NA	NA						
MS/MSD RPD	NA	NA						
Sample/Dup. RPD	NA	NA						
Sample Surrogates	12	12						
Internal STD Area	18	18						
TOTAL	102	102						
% Completeness		100%						

<sup>\*</sup>A MS/MSD, field blank, field blank duplicate, or sample duplicate were not received.

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3E060273

PARAMETER		RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
P307-050503 05/05/03 13:30 001					
Acenaphthene Benzo(b)thiophene Carbazole 2,3-Dihydroindene Fluorene 1-Methylnaphthalene		7.1 J 3.8 J 3.0 J 18 1.8 J 8.4 J	10 10 10 10 10	ug/L ug/L ug/L ug/L ug/L	SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C
P309-050503 05/05/03 15:15 003  Acenaphthene Carbazole 2,3-Dihydroindene Fluorene 1-Methylnaphthalene Naphthalene	ţ	39 15 23 1.7 J 7.7 J 4.2 J	10 10 10 10 10	ug/L ug/L ug/L ug/L ug/L ug/L	SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C

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# **METHODS SUMMARY**

### D3B060273

PARAMETER

ANALYTICAL PREPARATION METHOD

Semivolatile Organic Compounds by GC/MS

SW846 8270C

SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

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# **METHOD / ANALYST SUMMARY**

#### D3E060273

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ANALYTICAL

METHOD

ANALYST

ANALYST

ID

SW846 8270C

Tim O'Donnell

References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

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# **SAMPLE SUMMARY**

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## D3E060273

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FM77Q	001	P307-050503	05/05/03	13:30
FM77R	002	P308-050503	05/05/03	14:30
FM77T	003	P309-050503	05/05/03	15:15
FM77V	004	P112-050503	05/05/03	16:15
MOUND (C	• • •			

## NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivky, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

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# Client Sample ID: P307-050503

## GC/MS Semivolatiles

Lot-Sample #: D3E060273-001	Work Order #:	FM7701AA	Matrix WG
Date Sampled: 05/05/03	Date Received:		
Prep Date: 05/12/03	Analysis Date:		
Prep Batch #: 3132309	Analysis Time:		
Dilution Factor: 1	muryoro rime	10.17	
Dilacion raccor. 1	Method:	SW846 8270	r.
	rection	5.1010 0270	•
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	7.1 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND 6	10	ug/L
Benzo(b)fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	3.8 J	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	3.0 ₹	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	18	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	1.8 J	10	ug/L
Indene	ND	10	ug/L · · · · · · · · · · · · · · · · · · ·
Indeno(1,2,3-cd)pyrene	ND į	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	8.4 J	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	٤		
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	75	(30 - 160)	
Fluorene d-10	56	(36 - 127)	
Naphthalene-d8	58	(37 - 107)	

J Estimated result. Result is less than RL.

NOTE(S):

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## Client Sample ID: P308-050503

# GC/MS Semivolatiles

Lot-Sample #: D3E060273-002	Work Order #: FM77R1AA	Matrix WG
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 Date Sampled...:
 05/05/03
 Date Received..:
 05/06/03

 Prep Date.....:
 05/12/03
 Analysis Date..:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time..:
 16:56

Dilution Factor: 1 Method.....: SW846 8270C

	Method	Method SW846 8270C						
		REPORTIN	G					
PARAMETER	RESULT	LIMIT	UNITS					
Acenaphthene	ND	10	ug/L					
Acenaphthylene	ND	10	ug/L					
Acridine	ND	10	ug/L					
Anthracene	ND	10	ug/L					
Benzo(a)anthracene	ND	10	ug/L					
Benzo(b) fluoranthene	ND	10	ug/L					
Benzo(k)fluoranthene	ND	10	ug/L					
2,3-Benzofuran	ND .	10	ug/L					
Benzo(ghi)perylene	ND ,	10	ug/L					
Benzo(a) pyrene	ND .	10	ug/L					
Benzo(e)pyrene	ND	10	ug/L					
Benzo(b) thiophene	ND	10	ug/L					
Biphenyl	ND	10	ug/L					
Carbazole	ND	10	ug/L					
Chrysene	ND	10	ug/L					
Dibenzo (a, h) anthracene	ND	10	ug/L					
Dibenzofuran	ND	10	ug/L					
Dibenzothiophene	ND f	10	ug/L					
2,3-Dihydroindene	ND	10	ug/L					
Fluoranthene	ND	10	ug/L					
Fluorene	ND	10	ug/L					
Indene	ND	10	ug/L					
Indeno(1,2,3-cd)pyrene	ND	10	ug/L					
Indole	ND	10	ug/L					
2-Methylnaphthalene	ND	10	ug/L					
1-Methylnaphthalene	ND	10	ug/L					
Naphthalene	ND ,	10	ug/L					
Perylene	ND .	10	ug/L					
Phenanthrene	ND	10	ug/L					
Pyrene	ND	10	ug/L					
Quinoline	ND	10	ug/L					
	PERCENT	RECOVERY						
SURROGATE	RECOVERY	LIMITS	<u> </u>					
Chrysene-d12	70	(30 - 16	•					
Fluorene d-10	62 <sub>(</sub>	(36 - 12	=					
Naphthalene-d8	65	(37 - 10	7)					

## Client Sample ID: P309-050503

## GC/MS Semivolatiles

Lot-	Samp	le	#:	D3E060273-003	Work	Orde	r	#:	FM77T1AA	Matrix	.: WG
	_	-		0-10-100		_		-	/ /		

 Date Sampled...:
 05/05/03
 Date Received...:
 05/06/03

 Prep Date.....:
 05/12/03
 Analysis Date...:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time...:
 17:34

Dilution Factor: 1

Method....: SW846 8270C

		REPORTIN	G	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	39	10	ug/L	<del></del>
Acenaphthylene	ND	10	ug/L	
Acridine	ND ·	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo (a) anthracene	ND	10	ug/L	
Benzo (b) fluoranthene	ND	10	ug/L	
Benzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b) thiophene	ND é	10	ug/L	•
Biphenyl	ND	10	ug/L	
Carbazole	15	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
2,3-Dihydroindene	23	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	1.7 ភ្	10	ug/L	
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	úg/L	
2-Methylnaphthalene	ND	10	ug/L	
1-Methylnaphthalene	7.7 J	10	ug/L	
Naphthalene	4.2 J	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND g	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del></del>	,
Chrysene-d12	55	(30 - 160	-	
Fluorene d-10	56	(36 - 12		
Naphthalene-d8	58	(37 - 10	/)	

NOTE(S):

J Estimated result. Result is less than RL.

# Client Sample ID: P112-050503

### GC/MS Semivolatiles

Lot-Sample #:	D3E060273-004	Work Order #: FM77V1AA	Matrix WG

 Date Sampled...:
 05/05/03
 Date Received..:
 05/06/03

 Prep Date....:
 05/12/03
 Analysis Date..:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time..:
 18:13

Dilution Factor: 1

Method.....: SW846 8270C

	Method	: SW846 8270	SW846 8270C			
		REPORTING	INITEO			
PARAMETER	RESULT	LIMIT	UNITS			
Acenaphthene	ND	10	ug/L			
Acenaphthylene	ND	10	ug/L			
Acridine	ND	10	ug/L			
Anthracene	ND	10	ug/L			
Benzo(a) anthracene	ND	10	ug/L			
Benzo(b) fluoranthene	ND	10	ug/L			
Benzo(k) fluoranthene	ND ·	10	ug/L			
2,3-Benzofuran	ND	10	ug/L			
Benzo(ghi)perylene	ND	10	ug/L			
Benzo(a)pyrene	ND	10	ug/L			
Benzo(e)pyrene	ND	10	ug/L			
Benzo(b) thiophene	ND	10	ug/L			
Biphenyl	ND	10	ug/L			
Carbazole	ND	10	ug/L			
Chrysene .	ND	10	ug/L			
Dibenzo(a,h)anthracene	ND €	10	ug/L			
Dibenzofuran	ND	10	ug/L			
Dibenzothiophene	ND	10	ug/L			
2,3-Dihydroindene	ND	10	ug/L			
Fluoranthene	ND	10	ug/L			
Fluorene	ND	10	ug/L			
Indene	ND	10	ug/L			
Indeno(1,2,3-cd)pyrene	ND	10	ug/L			
Indole	ND	10	ug/L			
2-Methylnaphthalene	ND :	10	ug/L			
1-Methylnaphthalene	ND	10	ug/L			
Naphthalene	ND	10	ug/L			
Perylene	ND	10	ug/L			
Phenanthrene	ND	10	ug/L			
Pyrene	ND	10	ug/L			
Quinoline	ND	10	ug/L			
	PERCENT	RECOVERY				
SURROGATE	RECOVERY	LIMITS	_			
Chrysene-d12	49	(30 - 160)	ı			
Fluorene d-10	55	(36 - 127)	l			
Naphthalene-d8	57	(37 - 107)	ı			
	_	•				

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QC DATA ASSOCIATION SUMMARY

D3E060273

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3132309	3132120
002	WG	SW846 8270C		3132309	3132120
003	WG	SW846 8270C		3132309	3132120
004	WG	SW846 8270C		3132309	3132120

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#### METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E060273 Work Order #...: FNJR11AA Matrix......... WATER

MB Lot-Sample #: D3E120000-309

Dilution Factor: 1

PARAMETERRESULTLIMITUNITSMETHODAcenaphtheneND10ug/LSW846 8270C	<del></del>
Acenaphthylene ND 10 ug/L SW846 8270C	
Acridine ND 10 ug/L SW846 8270C	
Anthracene ND 10 ug/L SW846 8270C	
Benzo(a) anthracene ND 9 10 ug/L SW846 8270C	
Benzo(b) fluoranthene ND 10 ug/L SW846 8270C	
Benzo(k) fluoranthene ND 10 ug/L SW846 8270C	
2,3-Benzofuran ND 10 ug/L SW846 8270C	
Benzo(ghi)perylene ND 10 ug/L SW846 8270C	
Benzo(a)pyrene ND 10 ug/L SW846 8270C	
Benzo(e)pyrene ND 10 ug/L SW846 8270C	
Benzo (b) thiophene ND 10 ug/L SW846 8270C	
Biphenyl ND 10 ug/L SW846 8270C	
Carbazole ND 5 10 ug/L SW846 8270C	
Chrysene ND 10 ug/L SW846 8270C	
Dibenzo(a,h)anthracene ND 10 ug/L SW846 8270C	
Dibenzofuran ND 10 ug/L SW846 8270C	
Dibenzothiophene ND 10 ug/L SW846 8270C	
2,3-Dihydroindene ND 10 ug/L SW846 8270C	
Fluoranthene ND 10 ug/L SW846 8270C	
Fluorene ND 10 ug/L SW846 8270C	
Indene ND 10 ug/L SW846 8270C	
Indeno(1,2,3-cd)pyrene ND : 10 ug/L SW846 8270C	
Indole ND 10 ug/L SW846 8270C	
2-Methylnaphthalene ND 10 ug/L SW846 8270C	
1-Methylnaphthalene ND 10 ug/L SW846 8270C	
Naphthalene ND 10 ug/L SW846 8270C	
Perylene ND 10 ug/L SW846 8270C	
Phenanthrene ND 10 ug/L SW846 8270C	
Pyrene ND 10 ug/L SW846 8270C	
Quinoline ND 10 ug/L SW846 8270C	
PERCENT RECOVERY	
SURROGATE RECOVERY LIMITS	
Chrysene-d12 78 (30 - 160)	
Fluorene d-10 58 (36 - 127)	
Naphthalene-d8 61 (37 - 107)	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

### GC/MS Semivolatiles

Client Lot #...: D3E060273 Work Order #...: FNJR11AC Matrix..... WATER

LCS Lot-Sample#: D3E120000-309

Dilution Factor: 1

PARAMETER Benzo(e)pyrene Chrysene Fluorene Indene	PERCENT <u>RECOVERY</u> 80 77 78 61	RECOVERY LIMITS (30 - 150) (43 - 124) (51 - 120) (49 - 108)	METHOD SW846 8270C SW846 8270C SW846 8270C SW846 8270C
2-Methylnaphthalene	62	(47 - 138)	SW846 8270C
Naphthalene	64	(43 - 128)	SW846 8270C
Quinoline	66	(40 - 126)	SW846 8270C
ČITI DOGATIR	į	PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		87	(30 - 160)
Fluorene d-10		б4	(36 - 127)
Naphthalene-d8		68	(37 - 107)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

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## LABORATORY CONTROL SAMPLE DATA REPORT

### GC/MS Semivolatiles

Client Lot #...: D3E060273 Work Order #...: FNJR11AC Matrix..... WATER

LCS Lot-Sample#: D3E120000-309

Prep Date....: 05/12/03 Analysis Date..: 05/15/03
Prep Batch #...: 3132309 Analysis Time..: 14:59

Dilution Factor: 1

PARAMETER  Benzo(e)pyrene Chrysene Fluorene Indene 2-Methylnaphthalene Naphthalene	SPIKE AMOUNT 50.0 50.0 50.0 50.0 50.0	MEASURED <u>AMOUNT</u> 40.2 38.6 39.0 30.5 30.8 31.9	UNITS ug/L ug/L ug/L ug/L ug/L ug/L	PERCENT RECOVERY 80 77 78 61 62 64	METHOD SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C
Quinoline	50.0	32.8	ug/L	66	SW846 8270C
SURROGATE		PERCENT RECOVERY	RECOVERY LIMITS	_	
Chrysene-d12		87	(30 - 160)	• •	
Fluorene d-10		64	(36 - 127)		
Naphthalene-d8		68	(37 - 107)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

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#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E060273 Work Order #...: FM7741AC-MS Matrix..... WATER

MS Lot-Sample #: D3E060276-001 FM7741AD-MSD

 Date Sampled...:
 05/05/03
 Date Received..:
 05/06/03

 Prep Date....:
 05/12/03
 Analysis Date..:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time..:
 19:30

Dilution Factor: 1

	PERCENT		RECOVERY		RPD		
PARAMETER	RECOVERY_		LIMITS	RPD	LIMITS	METHO	D
Benzo (e) pyrene	72		(30 - 150)			SW846	8270C
	72		(30 - 150)	0.57	(0-30)	SW846	8270C
Chrysene	72	8	(43 - 124)			SW846	8270C
-	72		(43 - 124)	1.3	(0-30)	SW846	8270C
Fluorene	71		(51 - 120)			SW846	8270C
	67		(51 - 120)	4.0	(0-30)	SW846	8270C
Indene	66		(49 - 108)			SW846	8270C
	59		(49 - 108)	4.5	(0-30)	SW846	8270C
2-Methylnaphthalene	61		(47 - 138)			SW846	8270C
-	59		(47 - 138)	2.6	(0-30)	SW846	8270C
Naphthalene	88		(43 - 128)			SW846	8270C
	53	ď	(43 - 128)	3.2	(0-30)	SW846	8270C
Quinoline	70		(40 - 126)			SW846	8270C
	64		(40 - 126)	8.7	(0-30)	SWB46	8270C
			PERCENT		RECOVERY		
SURROGATE			RECOVERY		LIMITS		
Chrysene-d12	_		74		(30 - 160)	}	
<u>-</u>			68		(30 - 160)	)	
Fluorene d-10			62		(36 - 127)	)	
		Ť	57		(36 - 127)	)	
Naphthalene-d8			66		(37 - 107)	)	
-			63		(37 - 107)	)	

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NOTE(S):\_

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

### MATRIX SPIKE SAMPLE DATA REPORT

### GC/MS Semivolatiles

Client Lot #...: D3E060273 Work Order #...: FM7741AC-MS Matrix..... WATER

MS Lot-Sample #: D3E060276-001 FM7741AD-MSD

 Date Sampled...:
 05/05/03
 Date Received..:
 05/06/03

 Prep Date.....:
 05/12/03
 Analysis Date..:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time..:
 19:30

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT				
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOL	2	
Benzo (e) pyrene	ND	51.0	36.6	ug/L	72		SW846	8270C	
	ND	50.9	36.4	ug/L	72	0.57	SW846	8270C	
Chrysene	ND	51.0	36.9	ug/L	72		SW846	8270C	
	ND	50.9	36.4	ug/L	72	1.3	SW846	8270C	
Fluorene	8.4	51.0	44.5	ug/L	71		SW846	8270C	
	8.4	50.9	42.8	ug/L	67	4.0	SW846	8270C	
Indene	48	51.0	81.0	ug/L	66		SW846	8270C	
	48	50.9	77.5	ug/L	. 59	4.5	SW846	8270C	
2-Methylnaphthalene	14	51.0	45.1	ug/L	61		SW846	8270C	
	14	50.9	44.0	ug/L	59	2.6	SW846	8270C	
Naphthalene	540	51.0	584	ug/L	88		SW846	8270C	
	540	50.9	566	ug/L	53	3.2	SW846	8270C	
Quinoline	ND	51.0	35.5	ug/L	70		SW846	8270C	
	ND	50.9	32.5	ug/L	64	8.7	SW846	8270C	
		Pi	ERCENT		RECOVERY				
SURROGATE		RI	ECOVERY		LIMITS				
Chrysene-d12	<del></del>	74	4		(30 - 160)	)			
		ب 61	8		(30 - 160)	)			
Fluorene d-10		62	2		(36 - 127)	1			
		5'	7		(36 - 127)	)			
Naphthalene-d8		66	5		(37107)	)			
		63	3		(37 - 107)	)			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

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# Chair of Custody Record

مرکامه ح.بار



# Severn Trent Laboratories, Inc.

STL-4124 (0901)									
City of St. Louis	Park	Project Manager		derson			Date 5/5/03	Chain of Custody Nur	745
3753 Wooddale		Telephone Number	- 93	W - 2	557		Lab Number	Page	of
St. Lows Park MN Zip	<sup>Code</sup> 55416	Site Contact Bill Gre	299	Brian 5	tringu	Ar. mo	nalysis (Attach list if re space is needed)		
Project Name and Location (State)		Carrier/Waybill Nu	iMb€r		<b></b> - <b>J</b>	<b>8</b>		Special In	structions/
Contract/Purchase Order/Quote No.		Ma	atrix		ners & vatives	(PPR		Conditions	s of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time Wareous	Sort Sort	Unpres. HZSO4 HNO3	NaOH ZnAc/ NaOH	PA#			
P307-050503	5/5/03 13	330 X		X		X			
P308-050503	14	30		1					
P309-050503	15	715							
P112 - 050503		15	T.	1					
-									
				111	7   1				
						<del>                                     </del>			<del></del>
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<del></del>	<del></del>		<del>.     -  </del>		++++	╃╼╂╾┼╾┤		+	
Possible Hazard Identification	<u> </u>	Sample	Disposal					<u> </u>	
	Poison B 🔲 L	Inknown 🔲 Reti	urn To Client			Archive For	(A fee may be as Months longer than 1 mo	ssessed if samples are re onth)	alained 
Turn Around Time Required  24 Hours  48 Hours 7 Days 14 Da		Π		QC Requir	ements (Specif	y)			
1. Relinquished By		Other	Time 1700	1. Receive	d By	Att			Time DO15
2. Relinquished By		Date	Time	2. Receive	J V / -	-//	·		Time
3. Relinquished By		Date	Time	3. Receive	d By			Date	Time
Comments					····				



### **DATA QUALITY ASSESSMENT**

STL Project # D3E060273 (C)

July 1, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### **SUMMARY**

A data assessment was performed on the data for the analyses of four aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 5, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E060273.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

P307-050503

P308-050503

P309-050503

P112-050503

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

### Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperature upon receipt at the laboratory was 2.7°C. The cooler temperature was within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3132309. Target analytes were not detected in the laboratory method blank.

#### Surrogate Spike Recoveries

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on a sample W439-050503, which was from a different data package (D3E060276). All percent recoveries and relative percent differences (RPDs) were within the acceptable range.

### Field Duplicate Results

No duplicate samples were submitted with this data set.

#### **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected. All laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

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### ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E060276

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

**STL DENVER** 

Brian Stringer Project Manager

May 23, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
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<ul> <li>Executive Summary – Detection Highlights</li> </ul>	
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Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
QC Sample Results	
Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
· · · · · · · · · · · · · · · · · · ·	
Semivolatile GC	
• LC/MS or HPLC	
34.1	
• Metals	
:	
General Chemistry	
·	
. Subsequented Data	
Subcontracted Data	

# CASE NARRATIVE D3E060276

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

### Sample Receiving

One sample, one sample duplicate, one field blank, and one field blank duplicate were received under chain of custody on May 6, 2003. The samples were received in good condition at a temperature of 3.5°C.

### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3E050276-001 and 002 were analyzed at a 10x dilution for naphthalene, due to high concentrations of the target compound. As a result of the required dilutions, the surrogate recoveries were not calculated because the sample amount was greater than four times the spike amount. It is the laboratory's policy to consider all surrogates in the analyses with dilution factors of four or greater to be diluted out. Naphthalene is also reported from the 1x dilution of sample 001, because the MS/MSD was performed on this sample and the result is required to evaluate spike recoveries.

The MS/MSD performed on sample D3E060276-001 was in control.

No anomalies were observed.

# **Data Completeness for Method 8270C**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 100% completeness.

DATA COMPLETENESS CALCULATION								
LOT D3E060276								
ANALYSIS PAHs by SW846-8270C								
QC Parameter	Data	Valid Data						
	Planned	Obtained						
Method Blank	31	31						
MB Surrogates	3	3						
LCS	7	7						
LCS Surrogates	3	3						
FB/FBD	62	62						
MS	7	7						
MS Surrogates	3	3						
MSD	7	7						
MSD Surrogates	3	3						
MS/MSD RPD	7	7						
Sample/Dup. RPD	31	31						
Sample Surrogates	12	12						
Internal STD Area	24	24						
TOTAL	200	200						
% Completeness	100.00%							

<sup>\*</sup>A MS/MSD was performed on sample W439-050503

# Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD					
LOT D3E060276					
Sample: W439-050503		DUP: W439D-050503			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	58	Acenaphthene	61	5.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	3.1	2,3-Benzofuran	3.3	6.2	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	37	Benzo(b)thiophene	38	2.7	
Biphenyl	6.5	Biphenyl	6.7	3.0	
Carbazole	14	Carbazole	16	13.3	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	11	Diběnzofuran	11	0.0	
Dibenzothiophene	3.2	Dibenzothiophene	3.5	9.0	
2,3-Dihydroindene	160	2,3-Dihydroindene	160	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	8.4	Fluorene	9.1	8.0	
Indene	48	Indene	48	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	14	2-Methylnaphthalene	14	0.0	
1-Methylnaphthalene .	61	1-Methylnaphthalene	62	1.6	
Naphthalene	460	Naphthalene	480	4.3	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	7.5	Phenanthrene	8.4	11.3	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3B060276

PARAMETER		RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W439-050503 05/05/03 12:00 001					
Acenaphthene		58	10	ug/L	SW846 8270C
2,3-Benzofuran		3.1 J	10	ug/L	SW846 8270C
Benzo(b) thiophene		37	10	ug/L	SW846 8270C
Biphenyl		6.5 J	10	ug/L	SW846 8270C
Carbazole		14	10	ug/L	SW846 8270C
Dibenzofuran		11	10	ug/L	SW846 8270C
Dibenzothiophene		3.2 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	Ę	160	10	ug/L	SW846 8270C
Fluorene		8.4 J	10	ug/L	SW846 8270C
Indene		48	10	ug/L	SW846 8270C
2-Methylnaphthalene		14	10	ug/L	SW846 B270C
1-Methylnaphthalene		61	10	ug/L	SW846 B270C
Naphthalene		540 E	10	ug/L	SW846 8270C
Naphthalene		460	100	ug/L	SW846 B270C
Phenanthrene		7.5 J	10	ug/L	SW846 8270C
W439D-050503 05/05/03 12:10 002	: 1				
Acenaphthene		61	10	ug/L	SW846 8270C
2,3-Benzofuran		3.3 J	10	ug/L	SW846 8270C
Benzo(b)thiophene		38	10	ug/L	SW846 8270C
Biphenyl		6.7 J	10	ug/L	SW846 8270C
Carbazole		16	10	ug/L	SW846 8270C
Dibenzofuran		11	10	ug/L	SW846 8270C
Dibenzothiophene		3.5 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	É	160	10	ug/L	SW846 8270C
Fluorene		9.1 J	10	ug/L	SW846 8270C
Indene		48	10	ug/L	SW846 8270C
2-Methylnaphthalene		14	10	ug/L	SW846 8270C
1-Methylnaphthalene		62	10	ug/L	SW846 8270C
Naphthalene		480	100	ug/L	SW846 8270C
Phenanthrene		8.4 J	10	ug/L	SW846 8270C

## **METHODS SUMMARY**

### D3E060276

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PARAMETER

ANALYTICAL
METHOD

METHOD

Semivolatile Organic Compounds by GC/MS

SW846 8270C

SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

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# **METHOD / ANALYST SUMMARY**

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### D3B060276

ANALYTICAL			
METHOD	ANALYST	<u>ID /</u>	
SW846 8270C	Tim O'Donnell	000443	

### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

### D3E060276

<u>WO #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FM774	001	W439-050503	05/05/03	12:00
FM776	002	W439D-050503	05/05/03	12:10
FM777	003	W439FB-050503	05/05/03	12:30
FM778	004	W439FBD-050503	05/05/03	12:40

### NOTE (S):

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<sup>-</sup> The analytical results of the samples listed above are presented on the following pages.

<sup>-</sup> All calculations are performed before rounding to avoid round-off errors in calculated results.

<sup>-</sup> Results noted as "ND" were not detected at or above the stated limit.

<sup>-</sup> This report must not be reproduced, except in full, without the written approval of the laboratory.

<sup>-</sup> Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

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## Client Sample ID: W439-050503

## GC/MS Semivolatiles

Lot-Sample #: D3E060276-001	Work Order #:	FM7741AA	Matrix WG
Date Sampled: 05/05/03	Date Received:	05/06/03	
<b>Prep Date:</b> 05/12/03	Analysis Date:	05/15/03	
Prep Batch #: 3132309	Analysis Time:	18:52	
Dilution Factor: 1			
	34 . 4 1 7	027046 00000	

Method....: SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	58	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	3.1 J	10	ug/L
Benzo(ghi)perylene	ND é	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	37	10	ug/L
Biphenyl	6.5 J	10	ug/L
Carbazole	14	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	11	10	ug/L
Dibenzothiophene	3.2 J	10	ug/L
2,3-Dihydroindene	160 '	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	8.4 J	10	ug/L
Indene	48	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	14	10	ug/L
1-Methylnaphthalene	61	10	ug/L
Naphthalene	540 Ŗ	10	ug/L
Perylene	ND ;	10	ug/L
Phenanthrene	7.5 J	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	66	(30 - 160)	
Fluorene d-10	57	(36 - 127)	
Naphthalene-d8	61 <sup>`</sup>	(37 - 107)	

N	<u> TTC</u>	3 (S	;)	:	

J Estimated result. Result is less than RL.

 $<sup>\</sup>label{eq:expectation} \textbf{E} \quad \text{Estimated result. Result concentration exceeds the calibration range}.$ 

## Client Sample ID: W439-050503

## GC/MS Semivolatiles

Lot-Sample #: D3E060276-06 Date Sampled: 05/05/03 Prep Date: 05/12/03 Prep Batch #: 3132309 Dilution Factor: 10	Date Received  Analysis Date  Analysis Time	: 05/06/03 : 05/16/03	Matrix: WG
	Method	: SW846 8270	OC
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Naphthalene	460	100	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE (S):			

NC The recovery and/or RPD were not calculated.

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DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

## Client Sample ID: W439D-050503

## GC/MS Semivolatiles

Lot-Sample #: D3E060276-002	Work Order #: FM7761AA	Matrix WG
Date Sampled: 05/05/03	Date Received: 05/06/03	
<b>Prep Date:</b> 05/12/03	Analysis Date: 05/15/03	
Prep Batch #: 3132309	Analysis Time: 20:46	
Dilution Factor: 1		
	Method SW846 8270C	

		REPORTIN	rG	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	61	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo (a) anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k)fluoranthene	ND £	10	ug/L	
2,3-Benzofuran	3.3 J	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo (b) thiophene	38	10	ug/L	
Biphenyl	6.7 J	10	ug/L	
Carbazole	16	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND (	10	ug/L	
Dibenzofuran	11	10	ug/L	
Dibenzothiophene	3.5 J	10	ug/L	
2,3-Dihydroindene	160	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	9.1 J	10	ug/L	
Indene	48	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	14 6	10	ug/L	
1-Methylnaphthalene	62	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	8.4 J	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del></del>	
Chrysene-d12	88 i	(30 - 16	0)	
Fluorene d-10	65	(36 - 12	7)	
Naphthalene-d8	68	(37 - 10	7)	

## NOTE(S):

J Estimated result. Result is less than RL.

## Client Sample ID: W439D-050503

## GC/MS Semivolatiles

<pre>Lot-Sample #: D3E06023 Date Sampled: 05/05/03 Prep Date: 05/12/03 Prep Batch #: 3132309 Dilution Factor: 10</pre>	Date Received: Analysis Date:	05/06/03 05/16/03	Matrix: WG
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Naphthalene	480	100	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	•
NOTE (S) :			

NC The recovery and/or RPD were not calculated.

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DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

## Client Sample ID: W439FB-050503

## GC/MS Semivolatiles

Lot-Sample #...: D3E060276-003 Work Order #...: FM7771AA Matrix...... WG

 Date Sampled...:
 05/05/03
 Date Received...:
 05/06/03

 Prep Date.....:
 05/12/03
 Analysis Date...:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time...:
 21:25

Dilution Factor: 1

Method.....: SW846 8270C

		0,,010 02		
		REPORTIN	· ·G	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	<del></del>
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo(a) anthracene	ND #	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b) thiophene	ND	10	ug/L	
Biphenyl	ND	10	ug/L	
Carbazole	ND 6	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
2,3-Dihydroindene	ND	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	ND	10	ug/L	• •
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	ND	10	ug/L	
1-Methylnaphthalene	ND	10	ug/L	
Naphthalene	ND	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	80	(30 - 160	<u> </u>	
Fluorene d-10	57	(36 - 12		
Naphthalene-d8	63	(37 - 10		
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## Client Sample ID: W439FBD-050503

#### GC/MS Semivolatiles

Lot-Sample #: D3E060276-004	Work Order #: FM7781AA	Matrix WG
Date Sampled: 05/05/03	Date Received: 05/06/03	
Prep Date - 05/12/03	Analysis Date • 05/15/03	

 Prep Date.....:
 05/12/03
 Analysis Date...
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time...
 22:03

Dilution Factor: 1

Phenanthrene

Pyrene

Quinoline

Method.....: SW846 8270C

10

10

10

ug/L

ug/L

ug/L

REPORTING PARAMETER RESULT LIMIT UNITS Acenaphthene 10 ug/L Acenaphthylene ND 10 ug/L Acridine ND 10 ug/L Anthracene ND 10 ug/L Benzo(a) anthracene ND 10 ug/L Benzo(b) fluoranthene ND 10 ug/L Benzo(k) fluoranthene ND 10 ug/L 2,3-Benzofuran ND 10 ug/L Benzo(ghi)perylene ND 10 ug/L Benzo(a)pyrene ND 10 ug/L Benzo(e)pyrene ND 10 ug/L Benzo(b) thiophene ND 10 ug/L Biphenyl ND 10 ug/L Carbazole ND 10 ug/L

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Chrysene ND 10 ug/L Dibenzo (a, h) anthracene ND 10 ug/L Dibenzofuran ND 10 ug/L Dibenzothiophene ND 10 ug/L 2,3-Dihydroindene ND 10 ug/L Fluoranthene ND 10 ug/L Fluorene ND 10 ug/L Indene ND 10 ug/L Indeno(1,2,3-cd)pyrene ND 10 ug/L Indole ND 10 ug/L 2-Methylnaphthalene ND 10 uq/L 1-Methylnaphthalene ND 10 ug/L Naphthalene ND 10 ug/L Perylene ND 10 ug/L

ND

ND

ND

	PERCENT	RECOVERY
SURROGATE	RECOYERY	LIMITS
Chrysene-d12	79	(30 - 160)
Fluorene d-10	56	(36 - 127)
Naphthalene-d8	59	(37 - 107)

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QC DATA ASSOCIATION SUMMARY

D3B060276

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3132309	3132120
002	WG	SW846 8270C		3132309	3132120
003	WG	SW846 8270C		3132309	3132120
004	WG	SW846 8270C		3132309	3132120

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## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E060276 Work Order #...: FNJR11AA Matrix...... WATER

MB Lot-Sample #: D3E120000-309

Prep Date....: 05/12/03 Analysis Time..: 13:42

Dilution Factor: 1

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b)fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo(a)pyrene	ND	10	ug/L	SW846 8270C
Benzo (e) pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
'hrysene	ND	10	ug/L	SW846 8270C
∠ibenzo(a,h)anthracene	ND .	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND .	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	<u>LIMITS</u>	<del>_</del>	
Chrysene-d12	78	(30 - 160		
Fluorene d-10	58	(36 - 127		
Naphthalene-d8	61	(37 - 107	7}	

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E060276 Work Order #...: FNJR11AC Matrix.....: WATER

LCS Lot-Sample#: D3E120000-309

 Prep Date.....: 05/12/03
 Analysis Date..: 05/15/03

 Prep Batch #...: 3132309
 Analysis Time..: 14:59

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	80	(30 - 150)	SW846 8270C
Chrysene	77	(43 - 124)	SW846 8270C
Fluorene	78	(51 - 120)	SW846 8270C
Indene	61	(49 - 108)	SW846 8270C
2-Methylnaphthalene	62	(47 - 138)	SW846 8270C
Naphthalene	64	(43 - 128)	SW846 8270C
Quinoline	66	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE	٤	RECOVERY	LIMITS
Chrysene-d12		87	(30 - 160)
Fluorene d-10		64	(36 - 127)
Naphthalene-d8		68	(37 - 107)

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## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

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## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E060276 Work Order #...: FNJR11AC Matrix.....: WATER

LCS Lot-Sample#: D3E120000-309

 Prep Date.....: 05/12/03
 Analysis Date..: 05/15/03

 Prep Batch #...: 3132309
 Analysis Time..: 14:59

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	<u>UNIT\$</u>	REÇOVERY	METHOD
Benzo (e) pyrene	50.0	40.2	ug/L	80	SW846 8270C
Chrysene	50.0	38.6	ug/L	77	SW846 8270C
Fluorene	50.0	39.0	ug/L	78	SW846 8270C
Indene	50.0	30.5	ug/L	61	SW846 8270C
2-Methylnaphthalene	50.0 €	30.8	ug/L	62	SW846 8270C
Naphthalene	50.0	31.9	ug/L	64	SW846 8270C
Quinoline	50.0	32.8	ug/L	66	SW846 8270C
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS	_	
Chrysene-d12		87	(30 - 160)		
Fluorene d-10		64	(36 - 127)		
Naphthalene-d8		68	(37 - 107)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

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## MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E060276 Work Order #...: FM7741AC-MS Matrix.....: WG

MS Lot-Sample #: D3E060276-001 FM7741AD-MSD

 Date Sampled...:
 05/05/03
 Date Received..:
 05/06/03

 Prep Date.....:
 05/12/03
 Analysis Date..:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time..:
 19:30

Dilution Factor: 1

	PERCENT	RECOVERY		RPD		
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD	<u> </u>
Benzo (e) pyrene	72	(30 - 150)			SW846	8270C
	72	(30 - 150)	0.57	(0-30)	SW846	8270C
Chrysene	72	(43 - 124)			SW846	8270C
_	72	(43 - 124)	1.3	(0-30)	SW846	8270C
Fluorene	71	(51 - 120)			SW846	8270C
	67	(51 - 120)	4.0	(0-30)	SW846	8270C
Indene	66	(49 - 108)			SW846	8270C
	59	(49 - 108)	4.5	(0-30)	SW846	8270C
2-Methylnaphthalene	61	(47 - 138)			SW846	8270C
<del>-</del> -	59	(47 - 138)	2.6	(0-30)	SW846	8270C
Naphthalene	88	(43 - 128)			SW846	8270C
<del>-</del>	53	(43 ~ 128)	3.2	(0-30)	SW846	8270C
Quinoline	70	(40 - 126)			SW846	8270C
	64	(40 - 126)	8.7	(0-30)	SW846	8270C
		PERCENT		RECOVERY		
SURROGATE		RECOVERY		LIMITS		
Chrysene-d12	<del></del>	74		(30 - 160	<u>)</u>	
-		68		(30 - 160	)	
Fluorene d-10		62		(36 - 127	)	
		57		(36 - 127		
Naphthalene-d8		66		(37 - 107	•	
• -		63		(37 - 107	•	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

## MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E060276 Work Order #...: FM7741AC-MS Matrix............WG

MS Lot-Sample #: D3E060276-001 FM7741AD-MSD

 Date Sampled...:
 05/05/03
 Date Received...:
 05/06/03

 Prep Date.....:
 05/12/03
 Analysis Date...:
 05/15/03

 Prep Batch #...:
 3132309
 Analysis Time...:
 19:30

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT			
PARAMETER	TRUOMA	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD	
Benzo (e) pyrene	ND	51.0	36.6	ug/L	72		SW846 8270	C
	ND	50.9	36.4	ug/L	72	0.57	SW846 8270	С
Chrysene	ND	51.0	36.9	ug/L	72		SW846 8270	C
	ND	50.9	36.4	ug/L	72	1.3	SW846 8270	С
Fluorene	8.4	51.0	44.5	ug/L	71		SW846 8270	С
	8.4	50.9	42.8	ug/L	67	4.0	SW846 8270	C
Indene	48	51.0	81.0	ug/L	66		SW846 8270	C
	48	50.9	77.5	ug/L	59	4.5	SW846 8270	С
2-Methylnaphthalene	14	51.0	45.1	ug/L	61		SW846 8270	C
	14	50.9	44.0	ug/L	59	2.6	SW846 8270	C
Naphthalene	540	51.Ó	584	ug/L	88		SW846 8270	С
	540	50.9	566	ug/L	53	3.2	SW846 8270	C
Quinoline	NID	51.0	35.5	ug/L	70		SW846 8270	C
	ND	50.9	32.5	ug/L	64	8.7	SW846 8270	c
		PE	RCENT		RECOVERY			
SURROGATE		RE	COVERY		LIMITS			
Chrysene-d12	•	74			(30 - 160)	_		

	PERCENT	RECOVERI		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	74	(30 - 160)		
	68	(30 - 160)		
Fluorene d-10	€ 62	(36 - 127)		
	57	(36 - 127)		
Naphthalene-d8	66	(37 - 107)		
	63	(37 - 107)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

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# Chain of Custody Record



# Services Severn Trent Laboratories, Inc.

STL-4124 (0901)																						
Client		Project	-												Date	•				Chain o	Custody N	
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UTILITY DIVISION															Lab	Numb	<del>e</del> r	_	1			
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Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Ę	Sec.	ĵō S	Unpres.	H2SO4	HNO3	ĘÇ	NaOH ZoAci	NBOH		9									
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## **DATA QUALITY ASSESSMENT**

STL Project # D3E060276 (D)

July 1, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

## SUMMARY

A data assessment was performed on the data for the analyses of four aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 5, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E060276.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W439-050503 W439D-050503 W439FB-050503 W439FBD-050503

## **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



## **DISCUSSION**

## Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

## **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperature upon receipt at the laboratory was 3.5°C. The cooler temperature was within the QC criteria of between 2-6°C.

## **Method Blanks**

There was one method blank for this data package, batch 3132309. Target analytes were not detected in the laboratory method blank. A field blank (W439FB-050503) was analyzed and no concentrations of target analytes were found.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

## **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on a sample (W439-050503). All percent recoveries and relative percent differences (RPDs) were within the acceptable range.

## **Field Duplicate Results**

Sample W439-050503 was submitted as the field duplicate sample with this data set. A total of 14 of the 31 target analytes were detected in the duplicate samples. The precision was deemed acceptable because the RPDs for all analytes fell in the proper range (<30). A field blank and field blank duplicate sample were also analyzed for this data package. No target analytes were detected in these samples (W439FB-050503 and W439FBD-050503).



## **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Samples W439-050503 and W439D-050503 were reanalyzed and diluted by 10x due to elevated concentrations of the compound naphthalene in the samples. Sample quantitation limits (SQLs) were properly increased by lab.

All other laboratory reported quantitation limits for PPB analysis were at or below the reporting limits required by the QAPP.

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## ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E070215

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 10, 2003

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# Standard Deliverables with Supporting Documentation

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Standard Deliverables	
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Case Narrative	
• Executive Summary – Detection Highlights	
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Method/Analyst Summary	
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Analytical Results	
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Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
<ul> <li>Semivolatile GC/MS</li> <li>Volatile GC</li> </ul>	
• Semivolatile GC	
• LC/MS or HPLC	
• Metals	
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• Subcontracted Data	

# CASE NARRATIVE D3E070215

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

One sample, one sample duplicate, one field blank, and one field blank duplicate were received under chain of custody on May 7, 2003. The samples were received in good condition at a temperature of 2.8°C.

## GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The MS/MSD performed on sample D3E070215-001 demonstrated a relative percent difference that was above control limits for quinoline. This compound is known to be a poor performer through historical data. The MS/MSD and LCS were in control and none of the samples had a detection for quinoline.

No anomalies were observed.

## Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 99.5% completeness.

DATA COMPLETENESS CALCULATION							
LOT: D3E070215							
ANALYSIS PAHs by SW846-8270C							
QC Parameter	Data Planned	Valid Data Obtained					
Method Blank	31	31					
MB Surrogates	3	3					
LCS	7	7					
LCS Surrogates	3	3					
FB/FBD	62	62					
MS	7	7					
MS Surrogates	3	3					
MSD	7	7					
MSD Surrogates	3	3					
MS/MSD RPD	7	6					
Sample/Dup. RPD	31	31					
Sample Surrogates	12	12					
Samples and QC Internal Standard Area	24	24					
TOTAL	200	199					
% Completeness	99.5%						

<sup>\*</sup>A MS/MSD was performed on sample W422-050603

## Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD			T		
LOT D3E070215	[				
Sample: W422-050603		DUP: W422D-050603			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	8.6	Acenaphthene	9.1	5.6	
Acenaphthylene	ND	Acenaphthylene	ND	0	
Acridine	ND	Acridine	ND	0	
Anthracene	ND	Anthracene	ND	0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0	l
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0	
Biphenyl	ND	Biphenyl	ND	0	
Carbazole	ND	Carbazole	ND	0	
Chrysene	ND	Chrysene	ND	0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0	
Dibenzofuran	ND	Dibenzofuran	ND	0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0	
Fluoranthene	ND	Fluoranthene	ND	0	
Fluorene	ND	Fluorene	ND	0	
Indene	ND	Indene	ND	0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0	
Indole	ND	Indole	ND	0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0	
Naphthalene	ND	Naphthalene	ND	0	
Perylene	ND	Perylene	ND	0	
Phenanthrene	ND	Phenanthrene	ND	0	
Pyrene	ND	Pyrene	ND	0	
Quinoline	ND	Quinoline	ND	0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits

<sup>\*</sup>NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3B070215

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W422-050603 05/06/03 12:00 001				
Acenaphthene	8.6 J	10	ug/L	SW846 8270C
W422D-050603 05/06/03 12:10 002				
Acenaphthene	9.1 J	10	ug/L	SW846 8270C

## **METHODS SUMMARY**

## D3E070215

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **METHOD / ANALYST SUMMARY**

## D3B070215

ANALYTICAL METHOD	ANALYST	analyst Id
SW846 8270C	Tim O'Donnell	000443

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

## D3B070215

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FM9R0	001	W422-050603	05/06/03	12:00
FM9R5	002	W422D-050603	05/06/03	12:10
FM9R8	003	W422FB-050603	05/06/03	12:40
FM9TC	004	W422FBD-050603	05/06/03	12:50
NOTE (S	S):			

#### HOID (S)

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: W422-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070215-001	Work Order #: FM9R01AA	Matrix WG
-----------------------------	------------------------	-----------

 Date Sampled...:
 05/06/03
 Date Received...:
 05/07/03

 Prep Date.....:
 05/13/03
 Analysis Date...:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time...:
 17:18

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTING	<del>,</del>
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	8.6 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	85	(30 - 160	)
Fluorene d-10	76	(36 - 127	')
Naphthalene-d8	84	(37 - 107	')
-			

## NOTE(S):

J Estimated result. Result is less than RL.

## Client Sample ID: W422D-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070215-002	Work Order #: FM9R51AA	Matrix WG
Date Sampled: 05/06/03	Date Received: 05/07/03	
Prep Date: 05/13/03	Analysis Date: 06/05/03	
Prep Batch #: 3133200	Analysis Time: 19:12	
Dilution Factor: 1		

Method.....: SW846 8270C

		REPORTIN	G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	9.1 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
•			
	PERCENT	RECOVERY	•
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	105	(30 - 16	0)
Fluorene d-10	84	(36 - 12	7)
Naphthalene-d8	92	(37 - 10	7)

## NOTE(S):

J Estimated result. Result is less than RL.

## Client Sample ID: W422FB-050603

## GC/MS Semivolatiles

Lot-Sample #...: D3E070215-003 Work Order #...: FM9R81AA Matrix..... WG

 Date Sampled...:
 05/06/03
 Date Received...:
 05/07/03

 Prep Date.....:
 05/13/03
 Analysis Date...:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time...:
 19:49

Dilution Factor: 1

Method....: SW846 8270C

		REPORTING	3
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
CIIDBOOME			
SURROGATE Character 412	RECOVERY 97	LIMITS	<del>,,</del>
Chrysene-d12 Fluorene d-10	=	(30 - 160	•
	62	(36 - 127	
Naphthalene-d8	60	(37 - 107	' 1

## Client Sample ID: W422FBD-050603

## GC/MS Semivolatiles

Lot-Sample #:	D3E070215-004	Work Order #: FM9TC1AA	Matrix WG

 Date Sampled...:
 05/06/03
 Date Received..:
 05/07/03

 Prep Date.....:
 05/13/03
 Analysis Date..:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time..:
 20:27

Dilution Factor: 1

Naphthalene-d8

Method.....: SW846 8270C

		DEDODUTNA	
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Senzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Pluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
l-Methylnaphthalene	ND	10	ug/L
Maphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	101	(30 - 160)	
Fluorene d-10	70	(36 - 127)	•

(37 - 107)

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# QC DATA ASSOCIATION SUMMARY

## D3E070215

## Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3133200	3133060
002	WG	SW846 8270C		3133200	3133060
003	WG	SW846 8270C		3133200	3133060
004	WG	SW846 8270C		3133200	3133060

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070215 Work Order #...: FNLAA1AA Matrix..... WATER

MB Lot-Sample #: D3E130000-200

Prep Date....: 05/13/03 Analysis Time..: 16:02

Dilution Factor: 1

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo (a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo (ghi) perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b) thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
hrysene	ND	10	ug/L	SW846 8270C
Jibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
			_	
617777AG3777	PERCENT	RECOVER	Y	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	93	(30 - 10	•	
Fluorene d-10	68	(36 - 1	•	
Naphthalene-d8	75	(37 - 10	07}	

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070215 Work Order #...: FNLAA1AC Matrix..... WATER

LCS Lot-Sample#: D3E130000-200

 Prep Date.....: 05/13/03
 Analysis Date..: 06/05/03

 Prep Batch #...: 3133200
 Analysis Time..: 16:40

Dilution Factor: 1

Directon ractor. 1			
	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	90	(30 - 150)	SW846 8270C
Chrysene	85	(43 - 124)	SW846 8270C
Fluorene	76	(51 - 120)	SW846 8270C
Indene	65	(49 - 108)	SW846 8270C
2-Methylnaphthalene	63	(47 - 138)	SW846 8270C
Naphthalene	69	(43 - 128)	SW846 8270C
Quinoline	80	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		95	(30 - 160)
Fluorene d-10		68	(36 ~ 127)
Naphthalene-d8		72	(37 - 107)

## NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070215 Work Order #...: FNLAA1AC Matrix..... WATER

LCS Lot-Sample#: D3E130000-200

 Prep Date.....: 05/13/03
 Analysis Date..: 06/05/03

 Prep Batch #...: 3133200
 Analysis Time..: 16:40

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	44.9	ug/L	90	SW846 8270C
Chrysene	50.0	42.7	ug/L	85	SW846 B270C
Fluorene	50.0	37.9	ug/L	76	SW846 8270C
Indene	50.0	32.5	ug/L	65	SW846 8270C
2-Methylnaphthalene	50.0	31.6	ug/L	63	SW846 8270C
Naphthalene	50.0	34.5	ug/L	69	SW846 8270C
Quinoline	50.0	39.9	ug/L	80	SW846 8270C

	PERCENT	RECOVERY LIMITS	
SURROGATE	RECOVERY		
Chrysene-d12	95	(30 - 160)	
Fluorene d-10	68	(36 - 127)	
Naphthalene-d8	72	(37 - 107)	

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

`

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070215 Work Order #...: FM9R01AC-MS Matrix..... WG

MS Lot-Sample #: D3E070215-001 FM9R01AD-MSD

 Date Sampled...:
 05/06/03
 Date Received..:
 05/07/03

 Prep Date....:
 05/13/03
 Analysis Date..:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time..:
 17:56

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	97	(30 - 150)			SW846 8270C
	82	(30 - 150)	26	(0-30)	SW846 8270C
Chrysene	92	(43 - 124)			SW846 8270C
	77	(43 - 124)	28	(0-30)	SW846 8270C
Fluorene	79	(51 - 120)			SW846 8270C
	80	(51 - 120)	9.3	(0-30)	SW846 8270C
Indene	73	(49 - 108)			SW846 8270C
	71	(49 - 108)	13	(0-30)	SW846 8270C
2-Methylnaphthalene	68	(47 - 138)			SW846 8270C
	71	(47 - 138)	4.1	(0-30)	SW846 8270C
Naphthalene	74	(43 - 128)			SW846 8270C
	74	(43 - 128)	9.5	(0-30)	SW846 8270C
Quinoline	87	(40 - 126)			SW846 8270C
	64 p	(40 - 126)	40	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	_
Chrysene-d12		99		(30 - 16	0)
		71		(30 - 16	0)
Fluorene d-10		74		(36 - 12	7)
		67		(36 - 12	7)
Naphthalene-d8		82		(37 - 10	7)
		74		(37 - 10	7)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

p Relative percent difference (RPD) is outside stated control limits.

## MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070215 Work Order #...: FM9R01AC-MS Matrix..... WG

MS Lot-Sample #: D3E070215-001 FM9R01AD-MSD

 Date Sampled...:
 05/06/03
 Date Received...:
 05/07/03

 Prep Date.....:
 05/13/03
 Analysis Date...:
 06/05/03

Prep Batch #...: 3133200 Analysis Time..: 17:56

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	53.4	51.5	ug/L	97		SW846 8270C
	ND	48.4	39.6	ug/L	82	26	SW846 8270C
Chrysene	NID	53.4	49.2	ug/L	92		SW846 8270C
-	NID	48.4	37.1	ug/L	77	28	SW846 8270C
Fluorene	ND	53.4	42.3	ug/L	79		SW846 8270C
	ND	48.4	38.5	ug/L	80	9.3	SW846 8270C
Indene	ND	53.4	39.2	ug/L	73		SW846 8270C
	ND	48.4	34.4	ug/L	71	13	SW846 8270C
2-Methylnaphthalene	NID	53.4	36.0	ug/L	68		SW846 8270C
	NID	48.4	34.6	ug/L	71	4.1	SW846 8270C
Naphthalene	ND	53.4	39.6	ug/L	74		SW846 8270C
_	ND	48.4	36.0	ug/L	74	9.5	SW846 8270C
Quinoline	ND	53.4	46.6	ug/L	87		SW846 8270C
	ND	48.4	30.9	ug/L	64 p	40	SW846 8270C
		P	ERCENT		RECOVERY		
SURROGATE		R	ECOVERY		LIMITS		
Cl	<del></del>				(20 200	$\overline{}$	

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	99	(30 - 160)
	71	(30 - 160)
Fluorene d-10	74	(36 - 127)
	67	(36 - 127)
Naphthalene-d8	82	(37 - 107)
	74	(37 - 107)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

p Relative percent difference (RPD) is outside stated control limits.

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## Services Severn Trent Laboratories, Inc.

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#### DATA QUALITY ASSESSMENT

STL Project # D3E070215 (E)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of four aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 6, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E070215.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar and Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W422-050603 W422D-050603 W422FB-050603 W422FBD-050603

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperature upon receipt at the laboratory was 2.8°C. The cooler temperature was within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3133200. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample D3E070215-001. All percent recoveries and relative percent differences (RPDs) were within the acceptable range with the exception of quinoline. The RPD was 40 and fell outside the range of 0-30.

Compound	% Recovery MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Quinoline	ok/ok	40	40-126/0-30

#### **Field Duplicate Results**

Sample W422-050603 was submitted as the field duplicate sample with this data set. Only one target analyte was detected in the sample and it was at a level below the reporting limit of 10ug/l. The percent recoveries and RPDs were within range for all analytes.



the QAPP.

## **Quantitation Limits and Sample Results**

All laboratory reported	quantitation limits	for PPR analysis v	were at or helow the	reporting limits rec	uired by

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

/ **F** 



## **ANALYTICAL REPORT**

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E070219

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 10, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
Table of Contents	<u></u>
Case Narrative	
• Executive Summary – Detection Highlights	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
• Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
• Subcontracted Data	

# CASE NARRATIVE D3E070219

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Six samples were received under chain of custody on May 7, 2003. The samples were received in good condition at a temperature of 2.8°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The MS/MSD associated with batch 3133200 was performed on a sample from another lot and/or client and some demonstrated a relative percent difference that was above control limits.

No anomalies were observed.

## **Data Completeness for Method 8270C**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 100% completeness.

DATA COMPLETE	NESS CALC	ULATION
	D3E070219	
ANALYSIS:	PAHs by SV	V846-8270
QC Parameter	Data	Valid Data
	Planned	Obtained
Method Blank	31	31
MB Surrogates	3	3
LCS	7	7
LCS Surrogates	3	3
FB/FBD	NA	NA
MS	NA	NA
MS Surrogates	NA	NA
MSD	NA	NA
MSD Surrogates	NA	NA
MS/MSD RPD	NA	NA
Sample/Dup. RPD	NA	NA
Sample Surrogates	18	18
Samples, LCS, & MB	24	24
Internal Standard Area		
TOTAL.	86	86
% Completeness	100.00%	

<sup>\*</sup>A MS/MSD, field blank, field blank duplicate, or sample duplicate were not received with this lot.

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3B070219

		REPORTING	3	ANALYTICAL		
PARAMETER	RESULT	LIMIT	UNITS	METHOD		
P312-050603 05/06/03 10:00 001						
Acenaphthene	7.5 J	10	ug/L	SW846 8270C		
Carbazole	1.1 J	10	ug/L	SW846 8270C		
P310-050603 05/06/03 15:10 004						
Acenaphthene	10	10	ug/L	SW846 8270C		
Carbazole	5.6 J	10	ug/L	SW846 8270C		

## **METHODS SUMMARY**

## D3B070219

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **METHOD / ANALYST SUMMARY**

#### D3E070219

ANALYTICAL METHOD	ANALYST	ANALYST ID
SW846 8270C	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **SAMPLE SUMMARY**

#### D3B070219

<u>WO #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FM9VJ	001	P312-050603	05/06/03	10:00
FM9VM	002	P109-050603	05/06/03	12:00
FM9VP	003	W117-050603	05/06/03	10:20
FM9VR	004	P310-050603	05/06/03	15:10
FM9V0	005	W136-050603	05/06/03	14:20
FM9V3	006	W427-050603	05/06/03	16:20
MOVED /	21.			

#### NOTE (2)

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

## Client Sample ID: P312-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070219-001 Date Sampled: 05/06/03 Prep Date: 05/13/03 Prep Batch #: 3133200 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method:	05/07/03 06/05/03 21:04	Matrix WG
		DEDODETMO	
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	7.5 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi) perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	1.1 J	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Character and At O		120 2001	

83

70

76

(30 - 160)

(36 - 127)

(37 - 107)

## Note(s):

Chrysene-d12

Fluorene d-10

Naphthalene-d8

J Estimated result. Result is less than RL.

## Client Sample ID: P109-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070219-002	Work Order #: FM9VM1AA	Matrix: WG
-----------------------------	------------------------	------------

Date Received..: 05/07/03 Date Sampled...: 05/06/03 Prep Date....: 05/13/03 **Analysis Date..:** 06/05/03 Prep Batch #...: 3133200 Analysis Time..: 21:43

Dilution Factor: 1

Method....: SW846 8270C

		REPORTIN	r <b>G</b>
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND ·	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L`
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	•
SURROGATE	RECOVERY	<u>LIMITS</u>	<del></del>
Chrysene-d12	82	(30 - 16	0)
Fluorene d-10	63	(36 - 12	7)

	PERCENT	KECOVEKI	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	82	(30 - 160)	
Fluorene d-10	63	(36 - 127)	
Naphthalene-d8	70	(37 - 107)	

-1

## Client Sample ID: W117-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070219-003	Work Order #: FM9VP1AA	Matrix WG
Date Sampled - 05/06/03	Date Peceived • 05/07/03	

Date Sampled...: 05/06/03 Prep Date....: 05/13/03 Analysis Date..: 06/05/03 Prep Batch #...: 3133200 Analysis Time..: 22:21

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	88	(30 - 160	<del>-</del>
Fluorene d-10	64	(36 - 127	
Naphthalene-d8	62	(37 - 107	

## Client Sample ID: P310-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070219-004	Work Order #:	FM9VR1AA	Matrix WG
Date Sampled: 05/06/03	Date Received:	05/07/03	
Prep Date: 05/13/03	Analysis Date:	06/05/03	
Prep Batch #: 3133200	Analysis Time:		
Dilution Factor: 1			
	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	10	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	uq/L
2,3-Benzofuran	ND	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	uq/L
Carbazole	5.6 J	10	uq/L
Chrysene	ND	10	ug/L
Dibenzo(a,h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	77	(30 - 160)	
		(======================================	

62

56

(36 - 127)

(37 - 107)

## NOTE(S):

Fluorene d-10

Naphthalene-d8

J Estimated result. Result is less than RL.

## Client Sample ID: W136-050603

## GC/MS Semivolatiles

Lot-Sample #: D3E070219-005	Work Order #: FM9V01AA	Matrix: WG
DOC-Daimple # Dodo/0217-003	HOLK OTHER B THOUSEN	

Date Sampled...: 05/06/03 Date Received..: 05/07/03
Prep Date....: 05/13/03 Analysis Date..: 06/06/03
Prep Batch #...: 3133200 Analysis Time..: 12:10
Dilution Factor: 1

Method.....: SW846 8270C

Naphthalene-d8

		REPORTIN	r <b>G</b>
PARAMETER	RESULT	LIMIT	UNITS
cenaphthene	ND	10	ug/L
enaphthylene	ND	10	ug/L
ridine	ND	10	ug/L
thracene	ND	10	ug/L
enzo(a)anthracene	ND	10	ug/L
enzo(b)fluoranthene	ND	10	ug/L
enzo(k) fluoranthene	ND	10	ug/L
,3-Benzofuran	ND	10	ug/L
enzo(ghi)perylene	ND	10	ug/L
enzo(a)pyrene	ND	10	ug/L
enzo(e)pyrene	ND	10	ug/L
enzo(b) thiophene	ND	10	ug/L
phenyl	ND	10	ug/L
arbazole	ND	10	ug/L
nrysene	ND	10	ug/L
ibenzo(a,h)anthracene	ND	10	ug/L
ibenzofuran	ND	10	ug/L
benzothiophene	ND	10	ug/L
,3-Dihydroindene	ND	10	ug/L
luoranthene	ND	10	ug/L
luorene	ND	10	ug/L
ndene	ИD	10	ug/L
ndeno(1,2,3-cd)pyrene	ND	10	ug/L
ndole	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
aphthalene	ND	10	ug/L
erylene	ND	10	ug/L
henanthrene	ND	10	ug/L
yrene	ND	10	ug/L
uinoline	ND	10	ug/L
	PERCENT	RECOVERY	?
URROGATE	RECOVERY	LIMITS	
nrysene-d12	86	(30 - 16	<b>(0)</b>
luorene d-10	68	(36 - 12	!7)
1-1-1-3		(50 55	

75

(37 - 107)

## Client Sample ID: W427-050603

#### GC/MS Semivolatiles

: FM9V31AA	Matrix: WG
	: FM9V31AA

Date Sampled...: 05/06/03 Date Received..: 05/07/03 Prep Date....: 05/13/03 **Analysis Date..:** 06/06/03 Prep Batch #...: 3133200 Analysis Time..: 12:48

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTIN	'G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	•
SURROGATE	RECOVERY	LIMITS	·
Chrysene-d12	89	(30 - 16	0)
Fluorene d-10	65	(36 - 12	7)

	PERCENT	KECOVEKI		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	89	(30 - 160)		
Fluorene d-10	65	(36 - 127)		
Naphthalene-d8	72	(37 - 107)		

# QC DATA ASSOCIATION SUMMARY

## D3B070219

## Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	₩G	SW846 8270C		3133200	3133060
002	WG	SW846 8270C		3133200	3133060
003	WG	SW846 8270C		3133200	3133060
004	₩G	SW846 8270C		3133200	3133060
005	WG	SW846 8270C		3133200	3133060
006	WG	SW846 8270C		3133200	3133060

## METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E070219 Work Order #...: FNLAA1AA Matrix.....: WATER

MB Lot-Sample #: D3E130000-200

Prep Date.....: 05/13/03 Analysis Time..: 16:02

Dilution Factor: 1

		REPORTING	}	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b) thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/Ľ	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	93	(30 - 160	•	
Fluorene d-10	68	(36 - 127		
Naphthalene-d8	75	(37 - 107	')	

NOTE(S):

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070219 Work Order #...: FNLAA1AC Matrix.....: WATER

LCS Lot-Sample#: D3E130000-200

 Prep Date....:
 05/13/03
 Analysis Date..:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time..:
 16:40

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	90	(30 - 150)	SW846 8270C
Chrysene	85	(43 - 124)	SW846 8270C
Fluorene	76	(51 - 120)	SW846 8270C
Indene	65	(49 - 108)	SW846 8270C
2-Methylnaphthalene	63	(47 - 138)	SN846 8270C
Naphthalene	69	(43 - 128)	SW846 8270C
minoline	80	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
URROGATE		RECOVERY	LIMITS
rysene-d12		95	(30 - 160)
luorene d-10		68	(36 - 127)
aphthalene-d8		72	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E070219 Work Order #...: FNLAA1AC Matrix...... WATER

LCS Lot-Sample#: D3E130000-200

 Prep Date.....:
 05/13/03
 Analysis Date..:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time..:
 16:40

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	44.9	ug/L	90	SW846 8270C
Chrysene	50.0	42.7	ug/L	85	SW846 8270C
Fluorene	50.0	37.9	ug/L	76	SW846 8270C
Indene	50.0	32.5	ug/L	65	SW846 8270C
2-Methylnaphthalene	50.0	31.6	ug/L	63	SW846 8270C
Naphthalene	50.0	34.5	ug/L	69	SW846 8270C
Quinoline	50.0	39.9	ug/L	80	SW846 8270C
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS		
Chrysene-d12	-	95	(30 - 160)	0)	

127)107)

Chrysene-d12	95	(30
Fluorene d-10	68	(36
Naphthalene-d8	72	(37

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E070219 Work Order #...: FM9R01AC-MS Matrix.....: WATER

MS Lot-Sample #: D3E070215-001 FM9R01AD-MSD

 Date Sampled...:
 05/06/03
 Date Received..:
 05/07/03

 Prep Date.....:
 05/13/03
 Analysis Date..:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time..:
 17:56

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	97	(30 - 150)			SW846 8270C
	82	(30 - 150)	26	(0-30)	SW846 8270C
Chrysene	92	(43 - 124)			SW846 8270C
	77	(43 - 124)	28	(0-30)	SW846 8270C
Fluorene	79	(51 - 120)			SW846 8270C
	80	(51 - 120)	9.3	(0-30)	SW846 8270C
Indene	73	(49 - 108)			SW846 8270C
	71	(49 - 108)	13	(0-30)	SW846 8270C
2-Methylnaphthalene	68	(47 - 138)			SW846 8270C
	71	(47 - 138)	4.1	(0-30)	SW846 8270C
Naphthalene	74	(43 - 128)			SW846 8270C
	74	(43 - 128)	9.5	(0-30)	SW846 8270C
Quinoline	87	(40 - 126)			SW846 8270C
	64 p	(40 - 126)	40	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12	<del></del>	99		(30 - 160	<del>))</del>
		71		(30 - 160	))
Fluorene d-10		74		(36 - 127	7)
		67		(36 - 127	7)
Naphthalene-d8		82		(37 - 107	7)
		74		(37 - 107	7)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

p Relative percent difference (RPD) is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E070219 Work Order #...: FM9R01AC-MS Matrix..... WATER

MS Lot-Sample #: D3E070215-001 FM9R01AD-MSD

 Date Sampled...:
 05/06/03
 Date Received...:
 05/07/03

 Prep Date.....:
 05/13/03
 Analysis Date...:
 06/05/03

 Prep Batch #...:
 3133200
 Analysis Time...:
 17:56

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	TMA	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo(e)pyrene	ND	53.4	51.5	ug/L	97		SW846 8270C
	NID	48.4	39.6	ug/L	82	26	SW846 8270C
Chrysene	ND	53.4	49.2	ug/L	92		SW846 8270C
	ND	48.4	37.1	ug/L	77	28	SW846 8270C
Fluorene	ND	<b>53.4</b>	42.3	ug/L	79		SW846 8270C
	ND	48.4	38.5	ug/L	80	9.3	SW846 8270C
Indene	ND	53.4	39.2	ug/L	73		SW846 8270C
	ND	48.4	34.4	ug/L	71	13	SW846 8270C
2-Methylnaphthalene	ND	53.4	36.0	ug/L	68		SW846 8270C
	ND	48.4	34.6	ug/L	71	4.1	SW846 8270C
Naphthalene	ND	53.4	39.6	ug/L	74		SW846 8270C
	ND	48.4	36.0	ug/L	74	9.5	SW846 8270C
Quinoline	ND	53.4	46.6	ug/L	87		SW846 8270C
	ND	48.4	30.9	ug/L	64 p	40	SW846 8270C

•	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	99	(30 - 160)
	71	(30 - 160)
Fluorene d-10	74	(36 - 127)
	67	(36 - 127)
Naphthalene-d8	82	(37 - 107)
	74	(37 - 107)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

p Relative percent difference (RPD) is outside stated control limits.

# Chain of Custody Record

2.8 3/xlon



## Severn Trent Laboratories, Inc.

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#### **DATA QUALITY ASSESSMENT**

STL Project # D3E070219 (F)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of six aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 6, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E070219.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

P312-050603

P109-050603

W117-050603

P310-050603

W136-050603

W427-050603

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

#### Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperature upon receipt at the laboratory was 2.8°C. The cooler temperature was within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3133200. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on a sample from a different data set (D3E130215). All percent recoveries and relative percent differences (RPDs) were within the acceptable range with the exception of quinoline. The RPD was 40 and fell outside the range of 0-30.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Quinoline	ok/ok	40	40-126/0-30

### **Field Duplicate Results**

No duplicate samples were submitted with this data set.



## **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

All laboratory reported quantitation limits for PPB analysis were at or below the reporting limits required by the QAPP.



#### ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E130215

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 12, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
Table of Contents	
Case Narrative	
• Executive Summary - Detection Highlights	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
• Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
	<u></u>
Subcontracted Data	

# CASE NARRATIVE D3E130215

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

### Sample Receiving

Eight samples were received under chain of custody on May 13, 2003. The samples were received in good condition at temperatures of 4.6°C and 2.9°C.

## GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Sample D3E130215-002 was analyzed at a dilution for 1-methylnaphthalene due to high concentrations of target compounds. The reporting limits are adjusted accordingly.

The MS/MSD associated with batch 3136450 was performed on a sample from another lot and/or client and was in control.

No anomalies were observed.

## Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 100% completeness.

DATA COMPLETENESS CALCULATION									
LOT: D3E130215									
ANALYSIS: PAHs by SW846-8270C									
QC Parameter	Data	Valid Data							
	Planned	Obtained							
Method Blank	31	31							
MB Surrogates	3	3							
LCS	7	7							
LCS Surrogates	3	3							
FB/FBD	62	62							
MS	NA	NA							
MS Surrogates	NA	NA							
MSD	NA	NA							
MSD Surrogates	NA NA	NA							
MS/MSD RPD	NA	NA							
Sample/Dup. RPD	NA	NA							
Sample Surrogates	27	27							
Samples and QC	33	33							
Internal Standard Area									
TOTAL	166	166							
% Completeness	100.00%								

<sup>\*</sup>An MS/MSD or sample duplicate were not received with this lot.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3E130215

PAR	AMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W27-051203	3 05/12/03 14:00 001				
Ace	enaphthene	19	10	ug/L	SW846 8270C
	nzo(b)thiophene	2.8 J	10	ug/L	SW846 8270C
	phenyl	2.9 J	10	ug/L	SW846 8270C
_	bazole	2.8 J	10	ug/L	SW846 8270C
Dib	enzofuran	5.5 J	10	ug/L	SW846 8270C
2,3	-Dihydroindene	27	10	ug/L	SW846 8270C
	orene	7.2 J	10	ug/L	SW846 8270C
Ind	lene	7.6 J	10	ug/L	SW846 8270C
1-M	sethylnaphthalene	10	10	ug/L	SW846 8270C
	phthalene	3.8 J	10	ug/L	SW846 8270C
W437-05120	03 05/12/03 12:00 002				
Ace	enaphthene	180	10	ug/L	SW846 8270C
Acr	ridine	11	10	ug/L	SW846 8270C
2,3	-Benzofuran	2.2 J	10	ug/L	SW846 8270C
Ben	zo(b)thiophene	150	10	ug/L	SW846 8270C
Bip	phenyl	.34	10	ug/L	SW846 8270C
Car	bazole	110	10	ug/L	SW846 8270C
Dib	enzofuran	53	10	ug/L	SW846 8270C
Dib	enzothiophene	1.2 J	10	ug/L	SW846 8270C
2,3	-Dihydroindene	150	10	ug/L	SW846 8270C
Flu	orene	52	10	ug/L	SW846 8270C
Ind	lene	83	10	ug/L	SW846 8270C
2-M	Methylnaphthalene	110	10	ug/L	SW846 8270C
1-M	Methylnaphthalene	180	20	ug/L	SW846 8270C
W101-05120	03 05/12/03 11:25 003				
2,3	-Dihydroindene	14	10	ug/L	SW846 8270C
W426-05120	3 05/12/03 10:45 004				
	naphthene	150	10	ug/L	SW846 8270C
	hracene	4.3 J	10	ug/L	SW846 8270C
	zo(b)thiophene	5.9 J	10	ug/L	SW846 8270C
	henyl	25	10	ug/L	SW846 8270C
	bazole	22	10	ug/L	SW846 8270C
	enzofuran	39	10	ug/L	SW846 8270C
	enzothiophene	4.0 J	10	ug/L	SW846 8270C
	-Dihydroindene	45	10	ug/L	SW846 8270C
	oranthene	5.1 J	10	ug/L	SW846 8270C
Flu	orene	59	10	ug/L	SW846 8270C

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3B130215

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W426-051203 05/12/03 10:45 004				
Indene	9.0 J	10	ug/L	SW846 8270C
1-Methylnaphthalene	130	10	ug/L	SW846 8270C
Naphthalene	5.9 J	10	ug/L	SW846 8270C
Phenanthrene	68	10	ug/L	SW846 8270C
Pyrene	2.2 J	10	ug/L	SW846 8270C
W20-051203 05/12/03 14:45 005				
Naphthalene	6.4 Ј	10	ug/L	SW846 8270C

## **METHODS SUMMARY**

#### D3B130215

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **METHOD / ANALYST SUMMARY**

#### D3E130215

ANALYTICAL METHOD	ANALYST	ANALYST ID
SW846 8270C	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

#### D3R130215

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FNL6D	001	W27-051203	05/12/03	14:00
FNL6K	002	W437-051203	05/12/03	12:00
FNL6N	003	W101-051203	05/12/03	11:25
FNL6T	004	W426-051203	05/12/03	10:45
FNL6X	005	W20-051203	05/12/03	14:45
FNL63	006	W20FB-051203	05/12/03	14:35
FNL65	007	W20FBD-051203	05/12/03	14:40
FNL7A	008	W433-051203	05/12/03	16:30
	~1			

#### NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

#### Client Sample ID: W27-051203

#### GC/MS Semivolatiles

Lot-Sample #: D3E130215-001	Work Order #: FNL6D1AA	Matrix WG
Date Sampled: 05/12/03	Date Received: 05/13/03	
Prep Date: 05/17/03	Analysis Date: 06/06/03	
Prep Batch #: 3136450	Analysis Time: 13:27	
Dilution Factor: 1		

Method..... SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	19	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	2.8 Ј	10	ug/L
Biphenyl	2.9 J	10	ug/L
Carbazole	2.8 Ј	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	5.5 J	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	27	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	7.2 J	10	ug/L
Indene	7.6 Ј	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	10	10	ug/L
Naphthalene	3.8 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
·	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	68	(30 - 160)	1
Fluorene d-10	61	(36 - 127)	
Naphthalene-d8	57	(37 - 107)	

### NOTE (S):

J Estimated result. Result is less than RL.

## Client Sample ID: W437-051203

## GC/MS Semivolatiles

Lot-Sample #: D3E130215-002 Date Sampled: 05/12/03 Prep Date: 05/17/03	Work Order #: Date Received: Analysis Date:	05/13/03	Matrix: WG
Prep Batch #: 3136450	Analysis Time:		
Dilution Factor: 1	rate in its inc	14.03	
211111111111111111111111111111111111111	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	180	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	11	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	uq/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	2.2 J	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	150	10	ug/L
Biphenyl	34	10	ug/L
Carbazole	110	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	53	10	ug/L
Dibenzothiophene	1.2 J	10	ug/L
2,3-Dihydroindene	150	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	<b>52</b>	10	ug/L
Indene	83	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	110	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	

(30 - 160)

(36 - 127)

(37 - 107)

82

60

73

NOTE	<b>(S)</b>	:

Chrysene-d12

Fluorene d-10

Naphthalene-d8

J Estimated result. Result is less than RL.

## Client Sample ID: W437-051203

#### GC/MS Semivolatiles

Lot-Sample #: D3E130215-002 Date Sampled: 05/12/03 Prep Date: 05/17/03 Prep Batch #: 3136450 Dilution Factor: 2	Work Order #: Date Received: Analysis Date: Analysis Time:	05/13/03 06/06/03	Matrix WG
	Method:	SW846 8270	c
PARAMETER	RESULT	REPORTING LIMIT	UNITS
1-Methylnaphthalene	180	20	ug/L
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Chrysene-d12	71	(30 - 160)	
Fluorene d-10	57	(36 - 127)	
Naphthalene-d8	62	(37 - 107)	

## Client Sample ID: W101-051203

#### GC/MS Semivolatiles

Lot-Sample #:	D3E130215-003	Work Order #: FNL6N1AA	Matrix WG

Date Sampled...: 05/12/03 Date Received..: 05/13/03 **Prep Date....:** 05/17/03 Analysis Date..: 06/06/03 Prep Batch #...: 3136450 Analysis Time..: 14:44

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTIN	ig.
PARAMETER	RESULT	LIMIT	UNITS
cenaphthene	ND	10	ug/L
cenaphthylene	ND	10	ug/L
cridine	ND	10	ug/L
nthracene	ND	10	ug/L
enzo(a)anthracene	ND	10	ug/L
enzo(b)fluoranthene	ND	10	ug/L
enzo(k)fluoranthene	ND	10	ug/L
,3-Benzofuran	ND	10	ug/L
enzo(ghi)perylene	NTD	10	ug/L
enzo(a)pyrene	ND	10	ug/L
enzo(e)pyrene	ND	10	ug/L
enzo(b) thiophene	ND	10	ug/L
iphenyl	ND	10	ug/L
arbazole	ND	10	ug/L
hrysene	ND	10	ug/L
ibenzo(a,h)anthracene	ND	10	ug/L
ibenzofuran	ND	10	ug/L
ibenzothiophene	ND	10	ug/L
,3-Dihydroindene	14	10	ug/L
luoranthene	ND	10	ug/L
luorene	ND	10	ug/L
ndene	ND	10	ug/L
ndeno(1,2,3-cd)pyrene	ND	10	ug/L
ndole	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
aphthalene	ND	10	ug/L
erylene	ND	10	ug/L
henanthrene	ND	10	ug/L
yrene	ND	10	ug/L
uinoline	ND	10	ug/L
	PERCENT	RECOVERS	
URROGATE	RECOVERY	LIMITS	<del></del>
hrysene-d12	73	(30 - 16	50)
luorene d-10	56	(36 - 12	27)

	PERCENT	KECOVEKI
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	73	(30 - 160)
Fluorene d-10	56	(36 - 127)
Naphthalene-d8	53	(37 - 107)

#### Client Sample ID: W426-051203

#### GC/MS Semivolatiles

Matrix....: WG

Lot-Sample #...: D3E130215-004 Work Order #...: FNL6T1AA

Date Sampled: 05/12/03	Date Received.	.: 05/13/03	
Prep Date: 05/17/03	Analysis Date.	.: 06/06/03	
Prep Batch #: 3136450	Analysis Time.	.: 15:24	
Dilution Factor: 1			
	Method	.: SW846 827	0C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	150	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	4.3 J	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	5.9 J	10	ug/L
Biphenyl	25	10	ug/L
Carbazole	22	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	39	10	ug/L
Dibenzothiophene	4.0 J	10	ug/L
2,3-Dihydroindene	45	10	ug/L
Fluoranthene	5.1 J	10	ug/L
Fluorene	59	10	ug/L
Indene	9.0 J	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
			- 1-

10

10

10

10

10

10

ug/L

ug/L

ug/L

ug/L

ug/L

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	78	(30 - 160)
Fluorene d-10	62	(36 - 127)
Naphthalene-d8	58	(37 - 107)

130

ND

68

ND

5.9 J

2.2 J

#### NOTE(S):

1-Methylnaphthalene

Naphthalene

Phenanthrene

Perylene

Quinoline

Pyrene

J Estimated result. Result is less than RL.

## Client Sample ID: W20-051203

## GC/MS Semivolatiles

Lot-Sample #: D3E130215-005	Work Order #:	FNL6X1AA	Matrix WG
Date Sampled: 05/12/03	Date Received:	05/13/03	
Prep Date: 05/17/03	Analysis Date:		
Prep Batch #: 3136450	Analysis Time:		
Dilution Factor: 1	•		
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	uq/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	
Benzo(ghi) perylene	ND	10	ug/L ug/L
Benzo (ghi) peryiene Benzo (a) pyrene	ND	10	ug/L
Benzo(a) pyrene	ND	10	
<del></del>	ND	10	ug/L
Benzo(b) thiophene Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND ND	10	ug/L
Dibenzofuran	ND	10	ug/L ug/L
Dibenzothiophene	ND	10	ug/L
<del>-</del>	ND	10	
2,3-Dihydroindene Fluoranthene			ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	6.4 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	79	(30 - 160)	-
D1 1 10		106 105	

58

69

(36 - 127)

(37 - 107)

## NOTE (S):

Fluorene d-10

Naphthalene-d8

J Estimated result. Result is less than RL.

## Client Sample ID: W20FB-051203

#### GC/MS Semivolatiles

Lot-Sample #: D3E130	)215-006 Work Order	#: FNL6	31AA	Matrix	мG

 Date Sampled...:
 05/12/03
 Date Received..:
 05/13/03

 Prep Date.....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 20:03

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTING	G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
nthracene	ND	10	ug/L
enzo(a) anthracene	ND	10	ug/L
enzo(b) fluoranthene	ND	10	ug/L
enzo(k) fluoranthene	ND	10	ug/L
,3-Benzofuran	ND	10	ug/L
enzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
enzo(e) pyrene	ND	10	ug/L
enzo(b) thiophene	ND	10	ug/L
Siphenyl	ND	10	ug/L
arbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
oibenzo(a,h) anthracene	ND	10	ug/L
ibenzofuran	ND	10	ug/L
ibenzothiophene	ND	10	ug/L
,3-Dihydroindene	ND	10	ug/L
luoranthene	ND	10	ug/L
luorene	ND	10	ug/L
ndene	ND	10	ug/L
ndeno(1,2,3-cd)pyrene	ND	10	ug/L
indole	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
Saphthalene	ND	10	ug/L
erylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
:			-p, -
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	88	(30 - 16	<del>0)</del>
Fluorene d-10	60	(36 - 12	
Naphthalene-d8	62	(37 - 10	
-abucuatene-do	02	(37 10	• •

## Client Sample ID: W20FBD-051203

#### GC/MS Semivolatiles

Lot-Sample #:	D3E130215-007	Work Order #: FNL651AA	Matrix WG
The compact H	DDD434443 447	HOLE GEGGE WILL THEOLETE	

Date Sampled...: 05/12/03 Date Received..: 05/13/03 Prep Date....: 05/17/03 **Analysis Date..:** 06/06/03 Prep Batch #...: 3136450 Analysis Time..: 20:41

Dilution Factor: 1

Method..... SW846 8270C

		REPORTIN	r <b>G</b>
PARAMETER	RESULT	LIMIT	UNITS
cenaphthene	ND	10	ug/L
cenaphthylene	ND	10	ug/L
cridine	ND	10	ug/L
nthracene	ND	10	ug/L
enzo(a)anthracene	ND	10	ug/L
enzo(b)fluoranthene	ND	10	ug/L
enzo(k) fluoranthene	ND	10	ug/L
3-Benzofuran	ND	10	ug/L
enzo(ghi)perylene	ND	10	ug/L
enzo(a)pyrene	ND	10	ug/L
nzo (e) pyrene	ND	10	ug/L
enzo(b)thiophene	ND	10	ug/L
iphenyl	ND	10	ug/L
arbazole	ND	10	ug/L
hrysene	ND	10	ug/L
benzo(a,h)anthracene	ND	10	ug/L
benzofuran	ND	10	ug/L
benzothiophene	ND	10	ug/L
3-Dihydroindene	ND	10	ug/L
uoranthene	ND	10	ug/L
uorene	ND	10	ug/L
dene	ND	10	ug/L
deno(1,2,3-cd)pyrene	ND	10	ug/L
dole	ND	10	ug/L
Methylnaphthalene	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
aphthalene	ND	10	ug/L
erylene	ND	10	ug/L
henanthrene	ND	10	ug/L
yrene	ND	10	ug/L
inoline	ND	10	ug/L
	PERCENT	RECOVERY	•
URROGATE	RECOVERY	LIMITS	
rysene-d12	90	(30 - 16	<del>(0)</del>
luorene d-10	65	(36 - 12	
anhthalene_dQ	69	(27 - 10	

	PERCENT	RECOVERI
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	90	(30 - 160)
Fluorene d-10	65	(36 - 127)
Naphthalene-d8	68	(37 - 107)

#### Client Sample ID: W433-051203

#### GC/MS Semivolatiles

Lot-Sample #:	D3E130215-008	Work Order #: FNL7A1AA	Matrix WG

 Date Sampled...:
 05/12/03
 Date Received..:
 05/13/03

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 21:20

Dilution Factor: 1

Method.....: SW846 8270C

REPORTING
Acenaphthene ND 10 ug/L
<del>-</del>
Acridine ND 10 ug/L
Anthracene ND 10 ug/L
Benzo (a) anthracene ND 10 ug/L
Benzo (b) fluoranthene ND 10 ug/L
Benzo(k) fluoranthene ND 10 ug/L
2,3-Benzofuran ND 10 ug/L
Benzo(ghi)perylene ND 10 ug/L
Benzo (a) pyrene ND 10 ug/L
Benzo (e) pyrene ND 10 ug/L
Benzo (b) thiophene ND 10 ug/L
Biphenyl ND 10 ug/L
Carbazole ND 10 ug/L
Chrysene ND 10 ug/L
Dibenzo (a, h) anthracene ND 10 ug/L
Dibenzofuran ND 10 ug/L
Dibenzothiophene ND 10 ug/L
2,3-Dihydroindene ND 10 ug/L
Fluoranthene ND 10 ug/L
Fluorene ND 10 ug/L
Indene ND 10 ug/L
Indeno(1,2,3-cd)pyrene ND 10 ug/L
Indole ND 10 ug/L
2-Methylnaphthalene ND 10 ug/L
1-Methylnaphthalene ND 10 ug/L
Naphthalene ND 10 ug/L
Perylene ND 10 ug/L
Phenanthrene ND 10 ug/L
Pyrene ND 10 ug/L
Quinoline ND 10 ug/L
<b>J.</b>
PERCENT RECOVERY
SURROGATE RECOVERY LIMITS
Chrysene-d12 59 (30 - 160)
Fluorene d-10 62 (36 - 127)
Naphthalene-d8 65 (37 - 107)

## QC DATA ASSOCIATION SUMMARY

#### D3B130215

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3136450	3136202
002	WG	SW846 8270C		3136450	3136202
003	WG	SW846 8270C		3136450	3136202
004	WG	SW846 8270C		3136450	3136202
005	WG	SW846 8270C		3136450	3136202
006	WG	SW846 8270C		3136450	3136202
007	WG	SW846 8270C		3136450	3136202
008	WG	SW846 8270C		3136450	3136202

#### METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130215 Work Order #...: FNWW61AA Matrix...... WATER

MB Lot-Sample #: D3E160000-450

Prep Date....: 05/17/03 Analysis Time..: 10:54

Dilution Factor: 1

		REPORTING	1	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo (a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b)fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k)fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	95	(30 - 160	)	
Fluorene d-10	64	(36 - 127	)	
Naphthalene-d8	73	(37 - 107	)	

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Matrix....: WATER Client Lot #...: D3E130215 Work Order #...: FNWW61AC

LCS Lot-Sample#: D3E160000-450

**Prep Date....:** 05/17/03 Analysis Date..: 06/06/03 Prep Batch #...: 3136450 Analysis Time..: 11:32

PERCENT RECOVERY	
I DICEILI KOCO VEKI	
PARAMETER RECOVERY LIMITS METHOD	
Benzo (e) pyrene 89 (30 - 150) SW846 82	70C
Chrysene 87 (43 - 124) SW846 82	70C
Fluorene 81 (51 - 120) SW846 82	70C
Indene 66 (49 - 108) SW846 82	70C
2-Methylnaphthalene 64 (47 - 138) SW846 82	70C
Naphthalene 68 (43 - 128) SW846 82	70C
Quinoline 75 (40 - 126) SW846 82	270C
PERCENT RECOVERY	
SURROGATE RECOVERY LIMITS	
Chrysene-d12 97 (30 - 16	(0)
Fluorene d-10 66 (36 - 12	7)
Naphthalene-d8 72 (37 - 10	17)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130215 Work Order #...: FNWW61AC Matrix.....: WATER

LCS Lot-Sample#: D3E160000-450

 Prep Date....: 05/17/03
 Analysis Date..: 06/06/03

 Prep Batch #...: 3136450
 Analysis Time..: 11:32

Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
Benzo (e) pyrene	50.0	44.6	ug/L	89	SW846 8270C
Chrysene	50.0	43.7	ug/L	87	SW846 8270C
Fluorene	50.0	40.4	ug/L	81	SW846 8270C
Indene	50.0	33.2	ug/L	66	SW846 8270C
2-Methylnaphthalene	50.0	32.1	ug/L	64	SW846 B270C
Naphthalene	50.0	33.8	ug/L	68	SW846 B270C
Quinoline	50.0	37.4	ug/L	75	SW846 8270C
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS		
Chrysene-d12		97	(30 - 160)	)	
Fluorene d-10		66	(36 - 127)	)	
Naphthalene-d8		72	(37 - 107)	)	

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130215 Work Order #...: FNL731AC-MS Matrix....: WATER

MS Lot-Sample #: D3E130222-001 FNL731AD-MSD

 Date Sampled...:
 05/12/03
 Date Received...:
 05/13/03

 Prep Date.....:
 05/17/03
 Analysis Date...:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time...:
 22:37

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	80	(30 - 150)		•	SW846 8270C
	83	(30 - 150)	6.8	(0-30)	SW846 8270C
Chrysene	74	(43 - 124)			SW846 8270C
_	77	(43 - 124)	6.1	(0-30)	SW846 8270C
Fluorene	76	(51 - 120)			SW846 8270C
	81.	(51 - 120)	8.1	(0-30)	SW846 8270C
Indene	65	(49 - 108)			SW846 8270C
	58	(49 - 108)	10	(0-30)	SW846 8270C
2-Methylnaphthalene	64	(47 - 138)			SW846 8270C
	56	(47 - 138)	11	(0-30)	SW846 8270C
Naphthalene	68	(43 - 128)			SW846 8270C
	60	(43 - 128)	10	(0-30)	SN846 8270C
Quinoline	71	(40 - 126)			SW846 8270C
	79	(40 - 126)	13	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12	- <del></del>	40		(30 - 160	)
-		57		(30 - 160	)
Fluorene d-10		61		(36 - 127	·)
		67		(36 - 127	')
Naphthalene-d8		69		(37 - 107	<b>')</b>
		69		(37 - 107	')

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130215 Work Order #...: FNL731AC-MS Matrix..... WATER

MS Lot-Sample #: D3E130222-001 FNL731AD-MSD

 Date Sampled...:
 05/12/03
 Date Received...:
 05/13/03

 Prep Date.....:
 05/17/03
 Analysis Date...:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time...:
 22:37

Dilution Factor: 1

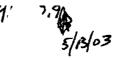
	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	TUUOMA	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	47.9	38.1	ug/L	80		SW846 8270C
	ND	48.9	40.8	ug/L	83	6.B	SW846 8270C
Chrysene	ND	47.9	35.4	ug/L	74		SW846 8270C
-	ND	48.9	37.6	ug/L	77	6.1	SW846 8270C
Fluorene	ND	47.9	36.6	ug/L	76		SW846 8270C
	ND	48.9	39.7	ug/L	81	8.1	SW846 8270C
Indene	ND	47.9	31.3	ug/L	65		SW846 8270C
	NID	48.9	28.2	ug/L	58	10	SW846 8270C
2-Methylnaphthalene	ND	47.9	30.5	ug/L	64		SW846 8270C
<del>-</del>	ND	48.9	27.2	ug/L	56	11	SW846 8270C
Naphthalene	ND	47.9	32.4	ug/L	68		SW846 8270C
-	ND	48.9	29.2	ug/L	60	10	SW846 8270C
Quinoline	ND	47.9	33.9	ug/L	71		SW846 8270C
	ND	48.9	38.5	ug/L	79	13	SW846 8270C
		PE	RCENT		RECOVERY		
SURROGATE		RE	COVERY		LIMITS		
(1) 31.0		4.0			120 160	_	

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	40	(30 - 160)
	57	(30 - 160)
Fluorene d-10	61	(36 - 127)
	67	(36 - 127)
Naphthalene-d8	69	(37 - 107)
	69	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## Chain of Custody Record





## Services Severn Trent Laboratories, Inc.

3TL-4124 (0901) Client		10 :	-4.00	-															_				
City of St. Louis Pack			Scoff Anderson					Date   12/03					C	Chain of Custody Number 150720									
3557 Woodale Ave	_	Telep	ohone i	<b>Vumbe</b>	(Area	Code,	)/Fax	Numb	oer .	•					L	ab Ni	mber			F	Page of		
Address 3557 Woodale Ave  Oity  St. Louis Park  MU 5	5416		Contac				Lab (	Contac		ringe				m	Inalys ore sp	is (A pace	ttach is ne	list if eded)					
Project Name and Location (State)			er/Way							<del>-</del> V		1					}				Special	nstructions/	
Contract/Purchase Order/Quote No.		<b>_</b>	T	Ma	ıtrix					ers & atives		PB				s						s of Receipt	
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	ķ.	Aqueous	26 156 86 156		Unpres.	H2SO4	Ž Ž	NaOH	Ğ.	₹X X											
W27-051203	5 203	1400	-+-	X	, <u>v</u>	T	2	+		\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	1<	X				1	_	<del>                                     </del>		$\dagger$	W27 2 W43	7 Areind	
W437-051203		1200	T	T	T		П					$\prod$	П								SLP coole	٧,	
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W20-051203		1445	+	71	1		$\parallel$	$\top$	+		+	$\dagger \dagger$						1		$\top$			
W20FB-051203		1435	+	#	1	$\vdash$	$\dagger \dagger$	_	$\dagger$	$\Box$	$\top$	#	1 1	+	1		_	$\dagger$		$\top$			
W20 FBO-051203		1440	+	1	+-	$\Box$	H	+	+	††	+	H		+	+	7	+	+		十			
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24 Hours	iys 🗌 21 Da																						
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2. Relinquished By		Date			Time		1	2. <b>R</b> ec	eived	Ву	3	<u></u>	7							l	Dale Dale	Time	
3. Relinquished By	<u> </u>	Date		 	Time		-	3. <b>Re</b> c	eived	Ву							_				Date	Time .	
Comments								-		-													



#### **DATA QUALITY ASSESSMENT**

STL Project # D3E130215 (G)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of eight aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 12, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E130215.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W27-051203

W437-051203

W101-051203

W426-051203

W20-051203

W20FB-051203

W20FBD-051203

W433-051203

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### **DISCUSSION**

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were 4.6°C and 2.9°C. The cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3136450. In addition to the method blank, a field blank and a field blank duplicate were collected for this data set (W20FB-051203 and W420FBD-051203). Target analytes were not detected in either of the laboratory method blank or field blanks.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on a sample from a different data set (D3E130222). All percent recoveries and relative percent differences (RPDs) were within the acceptable range.

#### **Field Duplicate Results**

No duplicate samples were submitted for this data set.

#### **Quantitation Limits and Sample Results**

All samples were analyzed undiluted with the exception of sample W437-051203. The sample was diluted at 2x due to elevated concentrations of 1-Methylnaphthalene in the sample. Sample quantitation limits (SQLs), were properly adjusted by the lab.

All laboratory reported quantitation limits for PPB analysis were at or below the reporting limits required by the QAPP.

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#### ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E130222

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 12, 2003

## **Table Of Contents**

## Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
• Table of Contents	<u> </u>
Case Narrative	
• Executive Summary – Detection Highlights	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
• Subcontracted Data	

# CASE NARRATIVE D3E130222

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

#### Sample Receiving

Two samples were received under chain of custody on May 13, 2003. The samples were received in good condition at temperatures of 4.6°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The MS/MSD performed on sample D3E130222-001 was in control.

No anomalies were observed.

## Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP. Based on the exceptions noted we achieved 100% completeness.

	11500 041 0	III ATION				
DATA COMPLETENESS CALCULATION						
LOT: D3E130222						
ANALYSIS: PAHs by SW846-8270C						
QC Parameter	Data	Valid Data				
	Planned	Obtained				
Method Blank	31	31				
MB Surrogates	3	3				
LCS	7	7				
LCS Surrogates	3	3				
FB/FBD	NA	NA				
MS	7	7				
MS Surrogates	3	3				
MSD	7	7				
MSD Surrogates	3	3				
MS/MSD RPD	7	7				
Sample/Dup. RPD	31	31				
Sample Surrogates	6	6				
Samples and QC	18	18				
Internal Standard Area						
TOTAL	126	126				
% Completeness	100.00%					

<sup>\*</sup>A field blank and field blank duplicate were not received with this lot.

## Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD	T		T -		
LOT D3E130222			<del> </del>		
Sample: W434-051203		DUP: W434D-051203			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	2.1	Acenaphthene	2.0	4.9	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	2.3	2,3-Dihydroindene	2.2	4.4	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits

<sup>\*</sup>NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

## **EXECUTIVE SUMMARY - Detection Highlights**

D3E130222

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W434-051203 05/12/03 12:00 001				
Acenaphthene	2.1 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	2.3 J	10	ug/L	SW846 8270C
W434D-051203 05/12/03 12:10 002				
Acenaphthene	2.0 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	2.2 J	10	ug/L	SW846 8270C

## **METHODS SUMMARY**

#### D3B130222

PARAMETER

ANALYTICAL PREPARATION METHOD

Semivolatile Organic Compounds by GC/MS

SW846 8270C

SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **METHOD / ANALYST SUMMARY**

#### D3B130222

ANALYTICAL METHOD	ANALYST	ANALYST ID
SW846 8270C	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **SAMPLE SUMMARY**

#### D3E130222

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FNL73 FNL77	001 002	W434-051203 W434D-051203	05/12/03 05/12/03	
MOTEL (C	١.			

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

## Client Sample ID: W434-051203

## GC/MS Semivolatiles

Lot-Sample #: D3E130222-001 Date Sampled: 05/12/03 Prep Date: 05/17/03 Prep Batch #: 3136450 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	05/13/03 06/06/03	Matrix WG
	Method:	SW846 8270	C
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	2.1 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	NID	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	NID	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	2.3 J	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
amprogram.	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	45	(30 - 160)	
Fluorene d-10	63	(36 - 127)	
Naphthalene-d8	67	(37 - 107)	

J Estimated result. Result is less than RL.

NOTE (S):

## Client Sample ID: W434D-051203

## GC/MS Semivolatiles

Lot Cample # - D2E120222 002	Work Order #:	DNI 771 X X	Matrix WG
Lot-Sample #: D3E130222-002	Date Received:		MdLIIX NG
Date Sampled: 05/12/03			
Prep Date: 05/17/03	Analysis Date:		
Prep Batch #: 3136450	Analysis Time:	23:53	
Dilution Factor: 1			
	Method:	SW846 8270	C
DADAMONED		REPORTING	INITEG
PARAMETER	RESULT 2.0 J	LIMIT	UNITS
Acenaphthene	ND	10 10	ug/L
Acenaphthylene Acridine	ND		ug/L
Anthracene	ND	10	ug/L
		10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	2.2 J	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	73	(30 - 160)	
Fluorene d-10	56	(36 - 127)	
Naphthalene-d8	62	(37 - 107)	

NOTE(S):

J Estimated result. Result is less than RL.

## QC DATA ASSOCIATION SUMMARY

#### D3E130222

## Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3136450	3136202
002	WG	SW846 8270C		3136450	3136202

#### METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130222 Work Order #...: FNWW61AA Matrix.....: WATER

MB Lot-Sample #: D3E160000-450

Prep Date....: 05/17/03 Analysis Time..: 10:54

Dilution Factor: 1

		REPORTII	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo (a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	NID	10	ug/L	SW846 8270C
Benzo(b) thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
irysene	ND	10	ug/L	SW846 8270C
ibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND .	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 B270C
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	95	(30 - 16	•	
Fluorene d-10	64	(36 - 12		
Naphthalene-d8	73	(37 - 10	)7)	

NOTE(S):

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130222 Work Order #...: FNWW61AC Matrix...... WATER

LCS Lot-Sample#: D3E160000-450

 Prep Date.....: 05/17/03
 Analysis Date..: 06/06/03

 Prep Batch #...: 3136450
 Analysis Time..: 11:32

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	89	(30 - 150)	SW846 8270C
Chrysene	87	(43 - 124)	SW846 8270C
Fluorene	81	(51 - 120)	SW846 8270C
Indene	66	(49 - 108)	5W846 8270C
2-Methylnaphthalene	64	(47 - 138)	SW846 8270C
Naphthalene	68	(43 - 128)	SW846 8270C
Quinoline	75	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE	_	RECOVERY	LIMITS
Chrysene-d12	-	97	(30 - 160)
Fluorene d-10		66	(36 - 127)
Naphthalene-d8		72	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

# GC/MS Semivolatiles

Client Lot #...: D3E130222 Work Order #...: FNWW61AC Matrix...... WATER

LCS Lot-Sample#: D3E160000-450

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 11:32

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	<b>AMOUNT</b>	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	44.6	ug/L	89	SW846 8270C
Chrysene	50.0	43.7	ug/L	87	SW846 8270C
Fluorene	50.0	40.4	ug/L	81	SW846 8270C
Indene	50.0	33.2	ug/L	66	SW846 8270C
2-Methylnaphthalene	50.0	32.1	ug/L	64	SW846 8270C
Naphthalene	50.0	33.8	ug/L	68	SW846 8270C
Quinoline	50.0	37.4	ug/L	75	SW846 8270C

	PERCENT	RECOVERY			
SURROGATE	RECOVERY	LIMITS			
Chrysene-d12	97	(30 - 160)			
Fluorene d-10	66	(36 - 127)			
Naphthalene-d8	72	(37 - 107)			

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130222 Work Order #...: FNL731AC-MS Matrix..... WG

MS Lot-Sample #: D3E130222-001 FNL731AD-MSD

 Date Sampled...:
 05/12/03
 Date Received..:
 05/13/03

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 22:37

Dilution Factor: 1

PERCENT	RECOVERY		RPD	
RECOVERY	LIMITS	RPD	LIMITS	METHOD
80	(30 - 150)			SW846 8270C
83	(30 - 150)	6.8	(0-30)	SW846 8270C
74	(43 - 124)			SW846 8270C
77	(43 - 124)	6.1	(0-30)	SW846 8270C
76	(51 - 120)			SW846 8270C
81	(51 - 120)	8.1	(0-30)	SW846 8270C
65	(49 - 108)			SW846 8270C
58	(49 - 108)	10	(0-30)	SW846 8270C
64	(47 - 138)			SW846 8270C
56	(47 - 138)	11	(0-30)	SW846 8270C
68	(43 - 128)			SW846 8270C
60	(43 - 128)	10	(0-30)	SW846 B270C
71	(40 - 126)			SW846 8270C
79	(40 - 126)	13	(0-30)	SW846 8270C
	PERCENT		RECOVERY	
	RECOVERY		LIMITS	
<del></del>	40		(30 - 16	0)
	57		(30 - 16	0)
	61		(36 - 12	7)
	67		(36 - 12	
	69		(37 - 10	
	*-		(37 - 10	•
	RECOVERY 80 83 74 77 76 81 65 58 64 56 68 60 71	RECOVERY  80  (30 - 150)  74  (43 - 124)  77  (43 - 124)  76  (51 - 120)  81  (51 - 120)  65  (49 - 108)  64  (47 - 138)  68  (47 - 138)  68  (43 - 128)  71  (40 - 126)  PERCENT  RECOVERY  40  57  61  67	RECOVERY  80 (30 - 150) 83 (30 - 150) 6.8 74 (43 - 124) 77 (43 - 124) 6.1 76 (51 - 120) 81 (51 - 120) 8.1 (65 (49 - 108) 58 (49 - 108) 10 64 (47 - 138) 11 68 (43 - 128) 60 (43 - 128) 60 71 (40 - 126) 79 (40 - 126) 13  PERCENT RECOVERY 40 57 61 67 69	RECOVERY LIMITS RPD LIMITS  80 (30 - 150) 83 (30 - 150) 6.8 (0-30) 74 (43 - 124) 77 (43 - 124) 6.1 (0-30) 76 (51 - 120) 81 (51 - 120) 8.1 (0-30) 65 (49 - 108) 58 (49 - 108) 10 (0-30) 64 (47 - 138) 56 (47 - 138) 11 (0-30) 68 (43 - 128) 60 (43 - 128) 60 (43 - 128) 79 (40 - 126) 79 (40 - 126) 79 (30 - 16 57 (30 - 16 61 (36 - 12 67 (36 - 12 69 (37 - 10

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E130222 Work Order #...: FNL731AC-MS Matrix.....: WG

MS Lot-Sample #: D3E130222-001 FNL731AD-MSD

 Date Sampled...:
 05/12/03
 Date Received..:
 05/13/03

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 22:37

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	ממפ	METHOD
Benzo (e) pyrene	ND ND	47.9	38.1		80	KED	SW846 8270C
Benzo (e) pyrene				ug/L			
	ND	48.9	40.8	ug/L	83	6.8	SW846 8270C
Chrysene	ND	47.9	35.4	ug/L	74		SW846 8270C
	ND	48.9	37.6	ug/L	77	6.1	SW846 8270C
Fluorene	ND	47.9	36.6	ug/L	76		SW846 8270C
	ND	48.9	39.7	ug/L	81	8.1	SW846 8270C
Indene	ND	47.9	31.3	ug/L	65		SW846 8270C
	ND	48.9	28.2	ug/L	58	10	SW846 8270C
2-Methylnaphthalene	ND	47.9	30.5	ug/L	64		SW846 8270C
	ND	48.9	27.2	ug/L	56	11	SW846 8270C
Naphthalene	ND	47.9	32.4	ug/L	68		SW846 8270C
мариснатене		48.9	29.2	—·.		10	SW846 8270C
	ND			ug/L	60	TO	
Quinoline	ND	47.9	33.9	ug/L	71		SW846 8270C
	ND	48.9	38.5	ug/L	79	13	SW846 8270C
•		P	ERCENT		RECOVERY		
SURROGATE		R	ECOVERY		LIMITS	_	
Chrysene-d12		4	0		<b>(30 - 160</b> )	)	
		5	7		(30 - 160)	)	
Fluorene d-10		6	1		(36 - 127)	)	
		6	7		(36 - 127)	)	

(37 - 107)

(37 - 107)

69

69

Note(s):

Naphthalene-d8

Calculations are performed before rounding to avoid round-off errors in calculated results.

# Chain of Custody Record

5/13/03



Services Severn Trent Laboratories, Inc.

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#### **DATA QUALITY ASSESSMENT**

STL Project # D3E130222 (H)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of two aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 12, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E130222.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W434-051203 W434D-051203

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperature upon receipt at the laboratory was 4.6°C. The cooler temperature was within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3136450. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample W434-051203. All percent recoveries and relative percent differences (RPDs) were within the acceptable range.

#### **Field Duplicate Results**

A duplicate sample was submitted for this data set. W434-051203 had measurable concentrations for two target analytes. The percent recoveries and RPDs were within the accepted range.

# **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs), therefore, were not affected.

All laboratory reported quantitation limits for PPB analysis were at or below the reporting limits required by the QAPP.

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# **ANALYTICAL REPORT**

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E140225

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 13, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

# **Report Contents Number of Pages** Standard Deliverables (The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.) **Table of Contents** • Case Narrative • Executive Summary - Detection Highlights Methods Summary Method/Analyst Summary • Lot Sample Summary Analytical Results • QC Data Association Summary Chain-of-Custody Check below when Supporting Documentation supporting documentation is (Note: A one-page "Description of Supporting Documentation" is present. provided at the beginning of this section.). Volatile GC/MS Semivolatile GC/MS Volatile GC Semivolatile GC • LC/MS or HPLC • Metals • General Chemistry Subcontracted Data

# CASE NARRATIVE D3E140225

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

# Sample Receiving

Eleven samples were received under chain of custody on May 14, 2003. The samples were received in good condition at temperatures of 4.6°C, 3.9°C, 3.8°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3E140225-001, 002 and 003 were analyzed at a dilution due to a high concentrations of target analytes in the samples. Analytes whose concentrations did not exceed the calibration range are reported from the undiluted analyses, while those compounds which required dilution are only reported from the diluted analyses. 2-Methylnaphthalene and naphthalene are reported in the undiluted analyses of sample 001 as a "E" flag to provide parent sample data for the MS/MSD performed on this sample.

The MSD performed on sample D3E140225-001 demonstrated a recovery that was below control limits for 2-methylnaphthalene. The MS was in control. The recoveries for naphthalene were not calculated because the sample amount was greater than four times the spike amount.

The MS/MSD associated with batch 3136450 was performed on a sample from another client and/or lot and was in control.

No other anomalies were observed.

# **Data Completeness for Method 8270C**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETE	NESS CALC	ULATION
	D3E140225	
ANALYSIS:	PAHs by SV	V846-8270C
QC Parameter	Data	Valid Data
	Planned	Obtained
Method Blank	62	62
MB Surrogates	6	6
LCS	14	14
LCS Surrogates	6	6
FB/FBD	62	62
MS	6	6
MS Surrogates	3	3
MSD	6	5
MSD Surrogates	3	3
MS/MSD RPD	6	6
Sample/Dup. RPD	31	31
Sample Surrogates	36	36
Samples and QC	51	51
Internal Standard Area		
TOTAL	292	291
% Completeness	99.7%	

<sup>\*</sup>A MS/MSD was performed on sample W420-051303.
\* Only the results from the MS/MSD performed on this sample are included in the calculation table.

# Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD					
LOT D3E140225					
Sample: W420-051303	i	DUP: W420D-051303			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	120	Acenaphthene	120	0.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	2.0	Anthracene	2.0	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	45	2,3-Benzofuran	49	8.5	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	130	Benzo(b)thiophene	140	7.4	
Biphenyl	23	Biphenyl	23	0.0	
Carbazole	83	Carbazole	82	1.2	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	L
Dibenzofuran	49	Dibenzofuran	49	0.0	
Dibenzothiophene	12	Dibenzothiophene	12	0.0	
2,3-Dihydroindene	300	2,3-Dihydroindene	320	6.5	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	51	Fluorene	50	2.0	
Indene	33	Indene	36	8.7	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	140	2-Methylnaphthalene	140	0.0	
1-Methylnaphthalene	140	1-Methylnaphthalene	140	0.0	
Naphthalene	2600	Naphthalene	2700	3.8	
Perylene	ND	Perylene	ND	0.0	L
Phenanthrene	34	Phenanthrene	35	2.9	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	1.5	Quinoline	1.4	6.9	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits

<sup>\*</sup>NC ≈ RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

#### D3B140225

		REPORTING		ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
	-		-	
W420-051303 05/13/03 12:00 001				
Acenaphthene	120 J	500	ug/L	SW846 8270C
Anthracene	2.0 J	10	ug/L	SW846 8270C
2,3-Benzofuran	45	10	ug/L	SW846 8270C
Benzo(b)thiophene	130	10	ug/L	SW846 8270C
Biphenyl	23	10	ug/L	SW846 8270C
Carbazole	83	10	ug/L	SW846 8270C
Dibenzofuran	49	10	ug/L	SW846 8270C
Dibenzothiophene	12	10	ug/L	SW846 8270C
2,3-Dihydroindene	300 J	500	ug/L	SW846 8270C
Fluorene	51	10	ug/L	SW846 8270C
Indene	33	10	ug/L	SW846 8270C
2-Methylnaphthalene	160 E	10	ug/L	SW846 8270C
2-Methylnaphthalene	140 J	500	ug/L	SW846 8270C
1-Methylnaphthalene	140 J	500	ug/L	SW846 8270C
Naphthalene	2900 E	10	ug/L	SW846 8270C
Naphthalene	2600	500	ug/L	SW846 8270C
Phenanthrene	34	10	ug/L	SW846 8270C
Quinoline	1.5 J	10	ug/L	SW846 8270C
W420D-051303 05/13/03 12:10 002				
Acenaphthene	120 J	500	ug/L	SW846 8270C
Anthracene	2.0 J	10	ug/L	SWB46 8270C
2,3-Benzofuran	49	10	ug/L	SW846 8270C
Benzo(b)thiophene	140	10	ug/L	SW846 8270C
Biphenyl	23	10	ug/L	SW846 8270C
Carbazole	82	10	ug/L	SW846 8270C
Dibenzofuran	49	10	ug/L	SW846 8270C
Dibenzothiophene	12	10	ug/L	SW846 8270C
2,3-Dihydroindene	320 J	500	ug/L	SW846 8270C
Fluorene	50	10	ug/L	SW846 8270C
Indene	36	10	ug/L	SW846 8270C
2-Methylnaphthalene	140 J	500	ug/L	SW846 8270C
1-Methylnaphthalene	140 J	500	ug/L	SW846 8270C
Naphthalene	2700	500	ug/L	SW846 8270C
Phenanthrene	35	10	ug/L	SW846 8270C
Quinoline	1.4 J	10	ug/L	SW846 8270C
W421-051303 05/13/03 12:40 003				
Acenaphthene	160	20	ug/L	SW846 8270C
Acenaphthylene	2.3 J	10	ug/L	SW846 8270C
Anthracene	59	10	ug/L	SW846 8270C
***************************************	37	10	49/H	5H040 02/0C

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

D3B140225

		REPORTIN	G	ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
21-051303 05/13/03 12:40 003				
21-031303 03/13/03 12.40 003				
Benzo(a)anthracene	74	10	ug/L	SW846 8270C
Benzo(b)fluoranthene	48	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	40	10	ug/L	SW846 8270C
Benzo(ghi)perylene	20	10	ug/L	SW846 8270C
Benzo(a)pyrene	48	10	ug/L	SW846 8270C
Benzo(e)pyrene	32	10	ug/L	SW846 8270C
Benzo(b) thiophene	27	10	ug/L	SW846 8270C
Biphenyl	20	10	ug/L	SW846 8270C
Carbazole	32	10	ug/L	SW846 8270C
Chrysene	56	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	6.5 J	10	ug/L	SW846 8270C
Dibenzofuran	81	10	ug/L	SW846 8270C
Dibenzothiophene	30	10	ug/L	SW846 8270C
2,3-Dihydroindene	110	10	ug/L	SW846 8270C
Fluoranthene	340	20	ug/L	SW846 8270C
Fluorene	150	10	ug/L	SW846 8270C
Indene	31	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	17	10	ug/L	SW846 8270C
2-Methylnaphthalene	59	10	ug/L	SW846 8270C
1-Methylnaphthalene	88	10	uq/L	SW846 8270C
Naphthalene	140	20	ug/L	SW846 8270C
Perylene	11	10	ug/L	SW846 8270C
Phenanthrene	510	20	ug/L	SW846 8270C
Pyrene	230	20	ug/L	SW846 8270C
09-051303 05/13/03 11:00  004			<b>J</b> .	
3		10	1-	G170 4 6 G0 B0 G
Acenaphthene	28	10	ug/L	SW846 8270C
Acenaphthylene	2.7 J	10	ug/L	SW846 8270C
Benzo (b) thiophene	15	10	ug/L	SW846 8270C
Biphenyl	4.1 J	10	ug/L	SW846 8270C
Carbazole	9.3 J	10	ug/L	SW846 8270C
Dibenzofuran	8.2 J	10	ug/L	SW846 8270C
Dibenzothiophene	1.3 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	8.0 J	10	ug/L	SW846 8270C
Fluorene	11	10	ug/L	SW846 8270C
Indene	28	10	ug/L	SW846 8270C
1-Methylnaphthalene	27	10	ug/L	SW846 8270C
Naphthalene	17	10	ug/L	SW846 8270C
Phenanthrene	11	10	ug/L	SW846 8270C

# **METHODS SUMMARY**

#### D3B140225

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

# D3E140225

ANALYTICAL	-	ANALYST
METHOD	ANALYST	ID
SW846 8270C	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

#### D3E140225

WO #	SAMPLE#	CLIENT SAMPLE ID		SAMP TIME
FNN87	001	W420-051303	05/13/03	12:00
FNN89	002	W420D-051303	05/13/03	12:10
FNN9C	003	W421-051303	05/13/03	12:40
FNN9J	004	W409-051303	05/13/03	11:00
FNN9T	005	W409FB-051303	05/13/03	10:50
FNN90	006	W409FBD-051303	05/13/03	10:55
FNN92	007	W428-051303	05/13/03	11:40
FNN96	800	W143-051303	05/13/03	14:30
FNN98	009	W438-051303	05/13/03	15:00
FNPAA	010	W431-051303	05/13/03	16:00
FNPAC	011	W131-051303	05/13/03	17:45

#### NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: W420-051303

#### GC/MS Semivolatiles

Lot-Sample #: D3E140225-001 Date Sampled: 05/13/03 Prep Date: 05/20/03 Prep Batch #: 3140180 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method	05/14/03 06/07/03 11:39	Matrix WG
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	2.0 J	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	45	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	130	10	ug/L
Biphenyl	23	10	ug/L
Carbazole	83	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	49	10	ug/L
Dibenzothiophene	12	10	ug/L
Fluoranthene	ND	10	ug/L
Pluorene	51	10	ug/L
Indene	33	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	160 E	10	ug/L
Naphthalene	2900 B	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	34	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	1.5 J	10	ug/L
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Chrysene-dl2	74		•
Fluorene d-10	74 60	(30 - 160)	
		(36 - 127)	
Naphthalene-d8	70	(37 - 107)	

J Estimated result. Result is less than RL.

NOTE (S):

E Estimated result. Result concentration exceeds the calibration range.

# Client Sample ID: W420-051303

Lot-Sample #: D3E140225-001 Date Sampled: 05/13/03 Prep Date: 05/20/03 Prep Batch #: 3140180 Dilution Factor: 50	Work Order #: Date Received: Analysis Date: Analysis Time: Method:	05/14/03 06/07/03 14:49	Matrix WG
	RESULT	REPORTING	INITEC
PARAMETER	120 J	LIMIT 500	UNITS ug/L
Acenaphthere	300 J	500	ug/L
2,3-Dihydroindene	140 J	500	ug/L
2-Methylnaphthalene	140 J	500	——————————————————————————————————————
1-Methylnaphthalene	2600		ug/L
Naphthalen€	2000	500	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

J Estimated result. Result is less than RL.

# Client Sample ID: W420D-051303

# GC/MS Semivolatiles

Lot-Sample #: D3E140225-002	Work Order #: FNN891AA	Matrix WG

 Date Sampled...:
 05/13/03
 Date Received...:
 05/14/03

 Prep Date.....:
 05/20/03
 Analysis Date...:
 06/07/03

 Prep Batch #...:
 3140180
 Analysis Time...:
 13:33

Dilution Factor: 1

Method..... SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	2.0 J	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ИD	10	ug/L
2.3-Benzofuran	49	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	140	10	ug/L
Biphenyl	23	10	ug/L
Carbazole	82	10	ug/L
Thrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	49	10	ug/L
Dibenzothiophene	12	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	50	10	ug/L
Indene	36	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	35	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	1.4 Ј	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	72	$\frac{510115}{(30 - 160)}$	<u>-</u>
Fluorene d-10	61	(36 - 127)	
Naphthalene-d8	72	(37 - 107)	•
Wahittigrene-do		(3) - 107	,

NOTE (S):

J Estimated result. Result is less than RL.

# Client Sample ID: W420D-051303

Lot-Sample #: D3E140225-002	Work Order #:	FNN892AA	Matrix: WG
Date Sampled: 05/13/03	Date Received:	05/14/03	
Prep Date: 05/20/03	Analysis Date:	06/07/03	
Prep Batch #: 3140180	Analysis Time:	15:26	
Dilution Factor: 50			
	Method:	SW846 8270	С
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	120 J	500	ug/L
2,3-Dihydroindene	320 J	500	ug/L
2-Methylnaphthalene	140 Ј	500	ug/L
1-Methylnaphthalene	140 J	500	ug/L
Naphthalene	2700	500	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	•
Chrysene-d12	NC,DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE (S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

J Estimated result. Result is less than RL.

# Client Sample ID: W421-051303

Lot-Sample #: D3E140225-003 Date Sampled: 05/13/03 Prep Date: 05/20/03 Prep Batch #: 3140180 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method:	05/14/03 06/07/03 14:11	Matrix: WG
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	2.3 J	10	ug/L
Acridine	ND	10	ug/L
Anthracene	59	10	ug/L
Benzo (a) anthracene	74	10	ug/L
Benzo(b) fluoranthene	48	10	ug/L
Benzo(k) fluoranthene	40	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	20	10	ug/L
Benzo (a) pyrene	48	10	ug/L
Benzo (e) pyrene	32	10	ug/L
Benzo(b)thiophene	27	10	ug/L
Biphenyl	20	10	ug/L
Carbazole	32	10	ug/L
Chrysene	56	10	ug/L
Dibenzo(a,h)anthracene	6.5 J	10	ug/L
Dibenzofuran	81	10	ug/L
Dibenzothiophene	30	10	ug/L
2,3-Dihydroindene	110	10 ,	ug/L
Fluorene	150	10	ug/L
Indene	31	10	ug/L
Indeno(1,2,3-cd)pyrene	17	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	59	10	ug/L
1-Methylnaphthalene	88	10	ug/L
Perylene	11	10	ug/L
Quinoline	ND	10	ug/L
	DED CENT	DECOMEDY	
SURROGATE	PERCENT RECOVERY	RECOVERY	
Chrysene-d12	73	LIMITS (30 - 160)	
Fluorene d-10	73 59	(36 - 180)	
Naphthalene-d8	63	(36 - 127) $(37 - 107)$	
NOTE(S):		(37 - 107)	

J Estimated result. Result is less than RL.

# Client Sample ID: W421-051303

Lot-Sample #: D3E140225-003 Date Sampled: 05/13/03	Date Received:	05/14/03	Matrix: WG
Prep Date: 05/20/03	Analysis Date:	• •	
Prep Batch #: 3140180	Analysis Time:	16:04	
Dilution Factor: 2			
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	160	20	uq/L
Fluoranthene	340	20	ug/L
	140	20	ug/L
Naphthalene			<b>—</b>
Phenanthrene	510	20	ug/L
Pyrene	230	20	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	64	(30 - 160)	
Fluorene d-10	52	(36 - 127)	
Naphthalene-d8	58	(37 - 107)	

# Client Sample ID: W409-051303

# GC/MS Semivolatiles

Lot-Sample #: D3E140 Date Sampled: 05/13			atrix WG
Prep Date: 05/17,		*. *.	
Prep Batch #: 313645	50 Analysis Time	: 00:31	
Dilution Factor: 1			

Method..... SW846 8270C

		REPORTIN	G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	28	10	ug/L
Acenaphthylene	2.7 J	10	ug/L
cridine	ND	10	ug/L
nthracene	ND	10	ug/L
enzo(a) anthracene	NID	10	ug/L
enzo(b) fluoranthene	ND	10	ug/L
enzo(k) fluoranthene	ND	10	ug/L
,3-Benzofuran	ND	10	ug/L
enzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	15	10	ug/L
Biphenyl	4.1 J	10	ug/L
Carbazole	9.3 J	10	ug/L
hrysene	ND	10	ug/L
pibenzo (a, h) anthracene	ND	10	ug/L
ibenzofuran	8.2 J	10	ug/L
)ibenzothiophene	1.3 J	10	ug/L
,3-Dihydroindene	8.0 J	10	ug/L
luoranthene	ND	10	ug/L
luorene	11	10	ug/L
ndene	28	10	սց/Ն
ndeno(1,2,3-cd)pyrene	ND	10	ug/L
ndole	ND	10	ug/L
-Methylnaphthalene	ND	10	ug/L
-Methylnaphthalene	27	10	ug/L
Iaphthalene	17	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	11	10	ug/L
Pyrene	ND	10	ug/L
uinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	48	(30 - 16	0)
Fluorene d-10	62	(36 - 12	•
Naphthalene-d8	58	(37 - 10	•
wheenstorn and		(5, 10	• •

SURROGATE	RECOVERY	LIMITS
Chrysene-d12	48	(30 - 160)
Fluorene d-10	62	(36 - 127)
Naphthalene-d8	58	(37 - 107)

NOTE(S):

I Estimated result. Result is less than RL.

# Client Sample ID: W409FB-051303

#### GC/MS Semivolatiles

Lot-Sample #: D3E140225-005	Work Order #: FNN9T1AA	<b>Matrix:</b> WG
-----------------------------	------------------------	-------------------

 Date Sampled...:
 05/13/03
 Date Received..:
 05/14/03

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/07/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 01:10

Dilution Factor: 1

Method.....: SW846 8270C

		PERCENTING			
PARAMETER	RESULT	REPORTING LIMIT	UNITS		
Acenaphthene	ND	10	ug/L		
Acenaphthylene	ND	10	ug/L		
Acridine	ND	10	ug/L		
Anthracene	ND	10	ug/L		
Benzo (a) anthracene	ND	10	ug/L		
Benzo(b) fluoranthene	ND	10	ug/L		
Benzo (k) fluoranthene	ND	10	ug/L		
2,3-Benzofuran	ND	10	ug/L		
Benzo (ghi) perylene	ND	10	ug/L		
Benzo (a) pyrene	ND	10	ug/L		
Benzo (e) pyrene	ND	10	ug/L		
Benzo(b)thiophene	ND	10	ug/L		
Biphenyl	ND	10	ug/L		
Carbazole	ND	10	ug/L		
Chrysene	ND	10	ug/L		
Dibenzo(a,h)anthracene	ND	10	ug/L		
Dibensofuran	ND	10	ug/L		
Dibenzothiophene	ND	10	ug/L		
2,3-Dihydroindene	ND	10	ug/L		
Fluoranthene	ND	10	ug/L		
Fluorene	ND	10	ug/L		
Indene	ND	10	ug/L		
Indene Indeno (1, 2, 3-cd) pyrene	ND ·	10	ug/L		
Indole	ND	10	ug/L		
Indoie 2-Methylnaphthalene	ND ND	10	ug/L ug/L		
2-Methylnaphthalene 1-Methylnaphthalene	ND	10	ug/L		
	ND UM		ug/L ug/L		
Naphthalene	ND D	10 10	ug/L		
Perylene Phenanthrene	ND ND	•	<del>-</del> ·		
	ND ND	10 10	ug/L		
Pyrene		<del>-</del>	ug/L		
Quinoline	ND	10	ug/L		
	PERCENT	RECOVERY			
SURROGATE	RECOVERY	LIMITS			
SURROGATE Chrysene-d12	80	$\frac{\text{BIMITS}}{(30 - 160)}$	•		
Fluorene d-10					
<del>-</del>	59	(36 - 127)			
Naphthalene-d8	67	(37 - 107)			

# Client Sample ID: W409FBD-051303

# GC/MS Semivolatiles

Lot-Sample #: D3E140225-006	Work Order #: FNN901AA	Matrix WG
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 Date Sampled...:
 05/13/03
 Date Received..:
 05/14/03

 Prep Date.....:
 05/17/03
 Analysis Date..:
 06/07/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 01:48

Dilution Factor: 1

Naphthalene-d8

Method.....: SW846 8270C

	MCCHOA!	5710-20 02	1700
		REPORTIN	īG
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
l-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	82	(30 - 16	0)
Fluorene d-10	56	(36 - 12	7)

(37 - 107)

60

# Client Sample ID: W428-051303

# GC/MS Semivolatiles

Lot-Sample #:	D3E140225-007	Work Or	rder #:	FNN921AA	Matrix WG

 Date Sampled...:
 05/13/03
 Date Received...:
 05/14/03

 Prep Date.....:
 05/17/03
 Analysis Date...:
 06/07/03

 Prep Batch #...:
 3136450
 Analysis Time...:
 02:26

Dilution Factor: 1

Naphthalene-d8

Method.....: SW846 8270C

	Method	: SW846 82	SW846 8270C		
		REPORTIN	G		
PARAMETER	RESULT	LIMIT	UNITS		
Acenaphthene	ND	10	ug/L		
Acenaphthylene	ND	10	ug/L		
Acridine	ND	10	ug/L		
Anthracene	ND	10	ug/L		
Benzo(a) anthracene	ND	10	ug/L		
Benzo(b) fluoranthene	ND	10	ug/L		
Benzo(k)fluoranthene	ND	10	ug/L		
2,3-Benzofuran	ND	10	ug/L		
Benzo(ghi)perylene	ND	10	ug/L		
Benzo(a) pyrene	ND	10	ug/L		
Benzo(e)pyrene	ND	10	ug/L		
Benzo(b)thiophene	ND	10	ug/L		
Biphenyl	ND	10	ug/L		
Carbazole	ND	10	ug/L		
Chrysene	ND	10	ug/L		
Dibenzo(a,h)anthracene	ND	10	ug/L		
Dibenzofuran	<b>N</b> D	10	ug/L		
Dibenzothiophene	ND	10	ug/L		
2,3-Dihydroindene	ND	10	ug/L		
Fluoranthene	ND	10	ug/L		
Fluorene	ND	10	ug/L		
Indene	<b>N</b> D	10	ug/L		
Indeno(1,2,3-cd)pyrene	ND	10	ug/L		
Indole	ND	10	ug/L		
2-Methylnaphthalene	ND	10	ug/L		
1-Methylnaphthalene	ND	10	ug/L		
Naphthalene	ND	10	ug/L		
Perylene	ND	10	ug/L		
Phenanthrene	ND	10	ug/L		
Pyrene	ND	10	ug/L		
Quinoline	ND	10	ug/L		
	PERCENT	RECOVERY			
SURROGATE	RECOVERY	LIMITS			
Chrysene-d12	75	(30 - 16	0)		
Fluorene d-10	63	(36 - 12	7)		
Namhthalana do	62	(27 10	71		

62

(37 - 107)

# Client Sample ID: W143-051303

# GC/MS Semivolatiles

Lot-Sample #:	D3E140225-008	Work Order #: FNN961AA	Matrix WG

Date Sampled...: 05/13/03 Date Received..: 05/14/03 Analysis Date..: 06/07/03 **Prep Date....:** 05/17/03 Prep Batch #...: 3136450 Analysis Time..: 11:00

Dilution Factor: 1

Method....: SW846 8270C

	Method	: 5W040 02	700
		REPORTING	3
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
			-
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	52	(30 - 16	<del>0)</del>
Fluorene d-10	56	(36 - 12	7)
Naphthalene-d8	59	(37 - 10	7)

# Client Sample ID: W438-051303

# GC/MS Semivolatiles

Lot-Sample #: D3E140225-009	Work Order #: FNN981AA	Matrix WG
Date Sampled: 05/13/03	Date Received: 05/14/03	
Prep Date: 05/17/03	Analysis Date: 06/07/03	
Prep Batch #: 3136450	Analysis Time: 03:42	
Dilution Factor: 1	_	

Method....: SW846 8270C

		REPORTIN	IG
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND	10	ug/L
Benzo(b)fluoranthene	MD	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	1.0	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	מא	10	ug/L
-		10	ug/ II
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	51	(30 - 160	<u> </u>
Fluorene d-10	55	(36 - 12'	-
Naphthalene-d8	60		•
adhirentarens-no	60	(37 - 107	<b>/</b> )

# Client Sample ID: W431-051303

#### GC/MS Semivolatiles

Lot-Sample #: D3E140225-010	Work Order #: FNPAA1AA	Matrix: WG
-----------------------------	------------------------	------------

 Date Sampled...:
 05/13/03
 Date Received...:
 05/14/03

 Prep Date.....:
 05/17/03
 Analysis Date...:
 06/07/03

 Prep Batch #...:
 3136450
 Analysis Time...:
 04:21

Dilution Factor: 1

Fluorene d-10

Naphthalene-d8

Method.....: SW846 8270C

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo(a)anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Senzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b) thiophene	ND	10	ug/L	
Siphenyl	ND	10	ug/L	
Carbazole	ND	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo (a, h) anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
,3-Dihydroindene	ND	10	ug/L	
Pluoranthene	ND	10	ug/L	
luorene	ND	10	ug/L	
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	ND	10	ug/L	
-Methylnaphthalene	ND	10	ug/L	
Naphthalene	ND	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	_	
Chrysene-d12	69	(30 - 160)	)	

(36 - 127)

(37 - 107)

63

64

#### Client Sample ID: W131-051303

#### GC/MS Semivolatiles

Lot-	Samp.	le	#:	D3E140225-011	Work	Orde	r	#:	FNPAC1AA	Matrix WG
_	_	_	_					-		

 Date Sampled...:
 05/13/03
 Date Received...:
 05/14/03

 Prep Date.....:
 05/17/03
 Analysis Date...:
 06/07/03

 Prep Batch #...:
 3136450
 Analysis Time...:
 04:59

Dilution Factor: 1

Method....: SW846 8270C

		REPORTING	1
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	· ND	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	82	(30 - 160	<del>))</del>
Fluorene d-10	65	(36 - 127	<b>'</b> )
Naphthalene-d8	64	(37 - 107	<b>'</b> )

# QC DATA ASSOCIATION SUMMARY

# D3B140225

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3140180	3140063
002	WG	SW846 8270C		3140180	3140063
003	WG	SW846 8270C		3140180	3140063
004	WG	SW846 B270C		3136450	3136202
005	WG	SW846 8270C		3136450	3136202
006	MG	SW846 8270C		3136450	3136202
007	WG	SW846 8270C		3136450	3136202
008	MG	SW846 8270C		3136450	3136202
009	WG	SW846 8270C		3136450	3136202
010	WG	SW846 8270C		3136450	3136202
011	WG	SW846 8270C		3136450	3136202

# METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FNWW61AA Matrix..... WATER

MB Lot-Sample #: D3E160000-450

Prep Date....: 05/17/03 Analysis Time..: 10:54

Dilution Factor: 1

PARAMETER RESULA Acenaphthene ND Acenaphthylene ND Acridine ND Anthracene ND Benzo(a) anthracene ND Benzo(b) fluoranthene ND Benzo(k) fluoranthene ND	LIMI 10 10 10 10 10 10 10 10 10 10 10 10 10	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	METHOD SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C
Acenaphthylene ND Acridine ND Anthracene ND Benzo(a) anthracene ND Benzo(b) fluoranthene ND	10 10 10 10 10 10	ug/L ug/L ug/L ug/L ug/L ug/L	SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C
Acridine ND Anthracene ND Benzo(a) anthracene ND Benzo(b) fluoranthene ND	10 10 10 10 10	ug/L ug/L ug/L ug/L ug/L	SW846 8270C SW846 8270C SW846 8270C SW846 8270C
Anthracene ND Benzo(a) anthracene ND Benzo(b) fluoranthene ND	10 10 10 10	ug/L ug/L ug/L ug/L	SW846 8270C SW846 8270C SW846 8270C
Benzo (a) anthracene ND Benzo (b) fluoranthene ND	10 10 10 10	ug/L ug/L ug/L	SW846 8270C SW846 8270C
Benzo(b) fluoranthene ND	10 10 10	ug/L ug/L	SW846 8270C
· ·	10 10	ug/L	
Benzo(k) fluoranthene ND	10		SW846 8270C
		1200 /T	
2,3-Benzofuran ND	10	ug/ II	SW846 8270C
Benzo(ghi)perylene ND	10	ug/L	SW846 8270C
Benzo(a) pyrene ND	10	ug/L	SW846 8270C
Benzo (e) pyrene ND	10	ug/L	SW846 8270C
Benzo (b) thiophene ND	10	ug/L	SW846 8270C
Biphenyl ND	10	ug/L	SW846 8270C
Carbazole ND	10	ug/L	SW846 8270C
Chrysene ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene ND	10	ug/L	SW846 8270C
Dibenzofuran ND	10	ug/L	SW846 8270C
Dibenzothiophene ND	10	ug/L	SW846 8270C
2,3-Dihydroindene ND	10	ug/L	SW846 8270C
Fluoranthene ND	10	ug/L	SW846 8270C
Fluorene ND	10	ug/L	SW846 8270C
Indene ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene ND	10	ug/L	SW846 8270C
Indole ND	10	ug/L	SW846 8270C
2-Methylnaphthalene ND	10	ug/L	SW846 8270C
1-Methylnaphthalene ND	10	ug/L	SW846 8270C
Naphthalene ND	10	ug/L	SW846 8270C
Perylene ND	10	ug/L	SW846 8270C
Phenanthrene ND	10	ug/L	SW846 8270C
Pyrene ND	10	ug/L	SW846 8270C
Quinoline ND	10	ug/L	SW846 8270C
PERC			
	VERY LIMI		
Chrysene-d12 95	·	- 160)	
Fluorene d-10 64		- 127)	
Naphthalene-d8 73	(37	- 107)	

NOTE(S):	

#### METHOD BLANK REPORT

# GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FN1651AA Matrix..... WATER

MB Lot-Sample #: D3E200000-180

**Prep Date....:** 05/20/03 **Analysis Time..:** 09:43

Dilution Factor: 1

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b)fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 B270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo(a)pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	DDD 4555			
CURRACEER	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del></del>	
Chrysene-d12	78	(30 - 160	•	
Fluorene d-10	59	(36 - 127		
Naphthalene-d8	68	(37 - 107	()	

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FNWW61AC Matrix..... WATER

LCS Lot-Sample#: D3E160000-450

Prep Date....: 05/17/03 Analysis Date..: 06/06/03
Prep Batch #...: 3136450 Analysis Time..: 11:32

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	89	(30 - 150)	SW846 8270C
Chrysene	87	(43 - 124)	SW846 8270C
Fluorene	81	(51 - 120)	SW846 8270C
Indene	66	(49 - 108)	SW846 8270C
2-Methylnaphthalene	64	(47 - 138)	SW846 8270C
Naphthalene	68	(43 - 128)	SW846 8270C
Quinoline	75	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12	=	97	(30 - 160)
Fluorene d-10		66	(36 - 127)
Naphthalene-d8		72	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FNWW61AC Matrix.....: WATER

LCS Lot-Sample#: D3E160000-450

Prep Date....: 05/17/03 Analysis Date..: 06/06/03 Prep Batch #...: 3136450 Analysis Time..: 11:32

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	44.6	ug/L	89	SW846 8270C
Chrysene	50.0	43.7	ug/L	87	SW846 8270C
Fluorene	50.0	40.4	ug/L	81	SW846 8270C
Indene	50.0	33.2	ug/L	66	SW846 8270C
2-Methylnaphthalene	50.0	32.1	ug/L	64	SW846 8270C
Naphthalene	50.0	33.8	ug/L	68	SW846 8270C
Quinoline	50.0	37.4	ug/L	75	SW846 8270C

•	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	97	(30 - 160)
Fluorene d-10	<b>66</b> .	(36 - 127)
Naphthalene-d8	72	(37 - 107)

Note (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FN1651AC Matrix..... WATER

LCS Lot-Sample#: D3E200000-180

 Prep Date....:
 05/20/03
 Analysis Date..:
 06/07/03

 Prep Batch #...:
 3140180
 Analysis Time..:
 10:21

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e) pyrene	71	(30 - 150)	SW846 8270C
Chrysene	67	(43 - 124)	SW846 8270C
Fluorene	69	(51 - 120)	SW846 8270C
Indene	62	(49 - 108)	SW846 8270C
2-Methylnaphthalene	62	(47 - 138)	SW846 8270C
Naphthalene	66	(43 - 128)	SW846 8270C
Quinoline	62	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12	•	77	(30 - 160)
Fluorene d-10		59	(36 - 127)
Naphthalene-d8		66	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FN1651AC Matrix.....: WATER

LCS Lot-Sample#: D3E200000-180

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	TRUOMA	TRUOMA	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	35.3	ug/L	71	SW846 8270C
Chrysene	50.0	33.3	ug/L	67	SW846 8270C
Fluorene	50.0	34.7	ug/L	69	SW846 8270C
Indene	50.0	31.2	ug/L	62	SW846 8270C
2-Methylnaphthalene	50.0	31.1	ug/L	62	SW846 8270C
Naphthalene	50.0	33.0	ug/L	66	SW846 8270C
Quinoline	50.0	31.0	ug/L	62	SW846 8270C

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	77	(30 - 160)
Fluorene d-10	59	(36 - 127)
Naphthalene-d8	66	(37 - 107)

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #: D3E140225	Work Order #: FNL	.731AC-MS <b>Ma</b> tr:	ix WATER
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MS Lot-Sample #: D3E130222-001 FNL731AD-MSD

 Date Sampled...:
 05/12/03
 Date Received..:
 05/13/03

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 22:37

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	80	(30 - 150)		•	SW846 8270C
	83	(30 - 150)	6.8	(0-30)	SW846 8270C
Chrysene	74	(43 - 124)			SW846 8270C
	77	(43 - 124)	6.1	(0-30)	SN846 8270C
Fluorene	76	(51 - 120)			SW846 8270C
	81	(51 - 120)	8.1	(0-30)	SW846 8270C
Indene	65	(49 - 108)			SW846 8270C
	58	(49 - 108)	10	(0-30)	SW846 8270C
2-Methylnaphthalene	64	(47 ~ 138)			SW846 8270C
	56	(47 - 138)	11	(0-30)	SW846 8270C
Naphthalene	68	(43 - 128)			SW846 8270C
	60	(43 - 128)	10	(0-30)	SW846 8270C
Quinoline	71	(40 - 126)			SW846 8270C
	79	(40 - 126)	13	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	<u></u>
Chrysene-d12	<del></del>	40		(30 - 160	0)
		57		(30 - 16)	0)
Fluorene d-10		61		(36 - 12	7)
		67		(36 - 12	7)
Naphthalene-d8		69		(37 - 10	7)
~		69		(37 - 10	7)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FNL731AC-MS Matrix..... WATER

MS Lot-Sample #: D3E130222-001 FNL731AD-MSD

 Date Sampled...:
 05/12/03
 Date Received..:
 05/13/03

 Prep Date....:
 05/17/03
 Analysis Date..:
 06/06/03

 Prep Batch #...:
 3136450
 Analysis Time..:
 22:37

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT			
PARAMETER	AMOUNT	AMT	TRUOMA	UNITS	RECVRY	RPD	METHOI	
Benzo(e)pyrene	ND	47.9	38.1	ug/L	80		SW846	8270C
	MD	48.9	40.8	ug/L	83	6.8	SWB46	8270C
Chrysene	ND	47.9	35.4	ug/L	74		SW846	8270C
	ND	48.9	37.6	ug/L	77	6.1	SW846	8270C
Fluorene	NID	47.9	36.6	ug/L	76		SW846	8270C
	ND	48.9	39.7	ug/L	81	8.1	SW846	8270C
Indene	ND	47.9	31.3	ug/L	<b>6</b> 5		SW846	8270C
•	ND	48.9	28.2	ug/L	58	10	SW846	8270C
2-Methylnaphthalene	ND	47.9	30.5	ug/L	64		SW846	8270C
	ND	48.9	27.2	ug/L	56	11	SW846	8270C
Naphthalene	ND	47.9	32.4	ug/L	68		SW846	8270C
_	ND	48.9	29.2	ug/L	60	10	SW846	8270C
Quinoline	ND	47.9	33.9	ug/L	71		SW846	8270C
	ND	48.9	38.5	ug/L	79	13	SW846	8270C
		PI	ERCENT		RECOVERY			
SURROGATE		RI	ECOVERY		LIMITS			
Chrysene-d12	<del></del>	40	<del></del>		(30 - 160)	- )		
_		57	7		(30 - 160)	•		
Fluorene d-10		61	l,		(36 - 127)	}		
•		61	7		(36 - 127)			
Naphthalene-d8		69	9		(37 - 107)			
_		69			(37 - 107)			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FNN871AC-MS Matrix...... WG

MS Lot-Sample #: D3E140225-001 FNN871AD-MSD

 Date Sampled...:
 05/13/03
 Date Received...:
 05/14/03

 Prep Date.....:
 05/20/03
 Analysis Date...:
 06/07/03

 Prep Batch #...:
 3140180
 Analysis Time...:
 12:17

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	68	(30 - 150)			SW846 8270C
	67	(30 - 150)	2.8	(0~30)	SW846 8270C
Chrysene	64	(43 - 124)			SW846 8270C
	63	(43 - 124)	2.0	(0-30)	SW846 8270C
Fluorene	70	(51 - 120)			SW846 8270C
	60	(51 - 120)	5.8	(0-30)	SW846 8270C
Indene	65	(49 - 108)			SW846 8270C
	57	(49 - 108)	6.3	(0-30)	SW846 8270C
2-Methylnaphthalene	58	(47 - 138)			SW846 8270C
	23 a	(47 - 138)	9.5	(0-30)	SW846 8270C
Naphthalene	NC	(43 - 128)			SW846 8270C
	NC	(43 - 128)		(0-30)	SW846 8270C
Quinoline	68	(40 - 126)			SW846 8270C
	66	(40 - 126)	2.8	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	<del></del>
Chrysene-d12		74		(30 - 160	1)
		72		(30 - 160	)
Fluorene d-10		58		(36 - 127	<b>'</b> )
		57		(36 - 127	<b>')</b>
Naphthalene-d8		67		(37 - 107	<b>')</b>
		68		(37 - 107	<b>'</b> }

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results. Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

NC The recovery and/or RPD were not calculated.

#### MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E140225 Work Order #...: FNN871AC-MS Matrix.....: WG

MS Lot-Sample #: D3E140225-001 FNN871AD-MSD

 Date Sampled...:
 05/13/03
 Date Received...:
 05/14/03

 Prep Date.....:
 05/20/03
 Analysis Date...:
 06/07/03

 Prep Batch #...:
 3140180
 Analysis Time...:
 12:17

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	TMA	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo(e)pyrene	ND	48.3	33.0	ug/L	68		SW846 8270C
	ND	48.2	32.1	ug/L	67	2.8	SW846 8270C
Chrysene	ND	48.3	30.9	ug/L	64		SW846 8270C
	ND	48.2	30.3	ug/L	63	2.0	SW846 8270C
Fluorene	51	48.3	84.9	ug/L	70		SW846 8270C
	51	48.2	80.0	ug/L	60	5.8	SW846 8270C
Indene	33	48.3	64.3	ug/L	65		SW846 8270C
	33	48.2	60. <b>4</b>	ug/L	57	6.3	SW846 8270C
2-Methylnaphthalene	160	48.3	190	ug/L	58		SW846 8270C
	160	48.2	173	ug/L	23 a	9.5	SW846 8270C
Naphthalene	2900	48.3		ug/L	NC		SW846 8270C
	2900	48.2		ug/L	NC		SW846 8270C
Quinoline	1.5	48.3	34.3	ug/L	68		SW846 8270C
	1.5	48.2	33.3	ug/L	66	2.8	SW846 8270C

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	74	(30 - 160)
	72	(30 - 160)
Fluorene d-10	58	(36 - 127)
	57	(36 - 127)
Naphthalene-d8	67	(37 - 107)
	68	(37 - 107)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

NC The recovery and/or RPD were not calculated.

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record





# Services Severn Trent Laboratories, Inc.

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# Chain of Custody Record

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# Chain of Custody Record





# SERVICES Severn Trent Laboratories, Inc.

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#### **DATA QUALITY ASSESSMENT**

STL Project # D3E140225 (I)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of 11 aqueous samples for parts per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on May 13, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E140225.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W420-051303

W420D-051303

W421-051303

W409-051303

W409FB-051303

W409FBD-051303

W428-051303

W143-051303

W438-051303

W431-051303

W131-051303

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks



- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 3.8°C and 4.6°C. The cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There were two method blanks for this data package, batch 3136450 and 3140180. Target analytes were not detected in the laboratory method blanks. In addition to the method blanks, a field blank and field blank duplicate were also submitted with this data set. Samples W409FB-051303 and W409FBD-051303 did not have any of the target analytes detected.

### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the two LCSs associated with all sample analyses.

#### MS/MSD Results

Two MS/MSD analyses were performed for this data set. Sample W434-051203 from data package D3E130222 had all percect recoveries and relative percent differences (RPDs) within the acceptable range. Sample W420-051303 had all percent recoveries and RPDs within the acceptable range except for 2-methylnaphthalene. The percent recovery was 23 for the MSD and fell outside the range of 47-138.



Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
2-Methylnaphthalene	ok/23	ok	47-138/0-30

# **Field Duplicate Results**

Duplicate samples were submitted for W420-051303 with this data set. A total of 16 out of 31 target analytes were detected in the samples. The percent recoveries and RPDs were within range for all analytes.

## **Quantitation Limits and Sample Results**

All samples were analyzed undiluted with the exception of samples W420-051303 and W420D-051303, which were diluted at 50x due to elevated concentrations of 2-methylnaphthalene and naphthalene. Sample quantitation limits (SQLs), were adjusted accordingly by the lab.

All laboratory reported quantitation limits for PPB analysis were at or below the reporting limits required by the QAPP.

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## **ANALYTICAL REPORT**

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E200234

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 19, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

# **Number of Pages Report Contents** Standard Deliverables (The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.) • Table of Contents Case Narrative • Executive Summary - Detection Highlights • Methods Summary Method/Analyst Summary • Lot Sample Summary • Analytical Results • QC Data Association Summary Chain-of-Custody Check below when Supporting Documentation supporting documentation is (Note: A one-page "Description of Supporting Documentation" is present. provided at the beginning of this section.). Volatile GC/MS Semivolatile GC/MS • Volatile GC • Semivolatile GC LC/MS or HPLC Metals • General Chemistry Subcontracted Data

# CASE NARRATIVE D3E200234

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Eight samples were received under chain of custody on May 20, 2003. The samples were received in good condition at temperatures of 3.2°C, 2.4°C, 2.6°C & 3.6°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3E200234-001 through 004 demonstrated recoveries of the surrogate chrysene-d12 of 12%, 20%, 23%, and 13% respectively, that were below control limits. The other two surrogates were in control. This may indicate a low bias in the sample data; however no sample volume was left for reanalysis and no further corrective action was taken.

Samples D3E200234-005 and 006 demonstrated recoveries of the surrogate fluorene d-10 of 39% and 36% respectively, that were below control limits. The other two surrogates were in control. This may indicate a low bias in the sample data; however no sample volume was left for reanalysis and further corrective action was taken.

Sample D3E200234-008 demonstrated recoveries of the surrogates chrysene-d12 and fluorene d-10 of 25% and 40% respectively, that were below control limits. This may indicate a low bias in the sample data; however no sample volume was left for reanalysis and therefore no further corrective action was taken.

The MS/MSD performed on sample D3E200234-007 demonstrated recoveries that were below control limits for benzo (e) pyrene.

No other anomalies were observed.

# Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

		·		
DATA COMPLETENESS CALCULATION				
	D3E200234			
ANALYSIS:	PAHs by SV	V846-8270C		
QC Parameter	Data	Valid Data		
	Planned	Obtained		
Method Blank	31	31		
MB Surrogates	3	3		
LCS	7	7		
LCS Surrogates	3	3		
FB/FBD	62	62		
MS	7	6		
MS Surrogates	3	2		
MSD	7	6		
MSD Surrogates	3	2		
MS/MSD RPD	7	7		
Sample/Dup. RPD	31	31		
Sample Surrogates	24	16		
Samples and QC	36	36		
Internal Standard Area				
TOTAL	224	212		
% Completeness	94.6%			

<sup>\*</sup>A MS/MSD was performed on sample St.P3-051903.

# Sample Duplicate Calculation for Method 8270C

Sample Dupilcate RPD					
LOT D3E200234					
Sample: SLP3-051903		DUP: SLP3D-051903			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	ND	Acenaphthene	ND	0.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	-
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothlophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3B200234

		REPORTING		ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
W133-051903 05/19/03 11:55 001				
Acenaphthene	7.7	5.7	ng/L	SW846 8270C SIM
Acridine	6.7	6.2	ng/L	SW846 8270C SIM
Benzo (b) fluoranthene	1.4 J	4.7	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	1.9 J	6.2	ng/L	SW846 8270C SIM
Benzo(a) pyrene	1.2 J	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	1.4 J	4.3	ng/L	SW846 8270C SIM
Benzo (b) thiophene	5.1 J	5.2	ng/L	SW846 8270C SIM
Carbazole	2.7 J	3.8	ng/L	SW846 8270C SIM
Dibenzothiophene	1.0 J	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	15	5.0	ng/L	SW846 8270C SIM
Fluoranthene	5.4	4.6	ng/L	SW846 8270C SIM
Fluorene	3.0 J	4.1	ng/L	SW846 8270C SIM
Indene	8.0	4.7	ng/L	SW846 8270C SIM
Indeno (1, 2, 3-cd) pyrene	1.4 J	5.4	ng/L	SW846 8270C SIM
2-Methylnaphthalene	13	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	9.8	5.6	ng/L	SW846 8270C SIM
Naphthalene	21	8.6	ng/L	SW846 8270C SIM
Phenanthrene	7.8	6.3	ng/L	SW846 8270C SIM
Pyrene	6.0	4.2	ng/L	SW846 8270C SIM
W411-051903 05/19/03 11:20 002				
Acenaphthene	18	5.7	ng/L	SW846 8270C SIM
Acridine	6.8	6.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	11	4.3	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	4.4 J	6.2	ng/L	SW846 8270C SIM
Benzo (e) pyrene	2.5 J	4.3	ng/L	SW846 8270C SIM
Carbazole	6.6	3.8	ng/L	SW846 8270C SIM
Chrysene	23	5.6	ng/L	SW846 8270C SIM
2,3-Dihydroindene	4.6 J	5.0	ng/L	SW846 8270C SIM
Fluoranthene	7.8	4.6	ng/L	SW846 8270C SIM
Fluorene	2.6 J	4.1	ng/L	SW846 8270C SIM
Indene	4.9	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	7.3	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	5.8	5.6	ng/L	SW846 8270C SIM
Naphthalene	15	8.6	ng/L	SW846 8270C SIM
Phenanthrene	12	6.3	ng/L	SW846 8270C SIM
Pyrene	19	4.2	ng/L	SW846 8270C SIM

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3B200234

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W122-051903 05/19/03 14:30 003				
Acenaphthene	5.2 J	5.7	ng/L	SW846 8270C SIM
Benzo(a) anthracene	7.2	4.3	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	5.4 J	6.2	ng/L	SW846 8270C SIM
Benzo(e)pyrene	2.8 J	4.3	ng/L	SW846 8270C SIM
Carbazole	3.4 J	3.8	ng/L	SW846 8270C SIM
Chrysene	16	5.6	ng/L	SW846 8270C SIM
2,3-Dihydroindene	3.3 J	5.0	ng/L	SW846 8270C SIM
Fluoranthene	4.6	4.6	ng/L	SW846 8270C SIM
Indene	4.4 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	5.4 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	3.6 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	11	8.6	ng/L	SW846 8270C SIM
Phenanthrene	8.8	6.3	ng/L	SW846 8270C SIM
Pyrene	20	4.2	ng/L	SW846 8270C SIM
W412-051903 05/19/03 15:45 004				
Acridine	2.7 J	6.2	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	2.6 J	4.7	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	4.3 J	6.2	ng/L	SW846 8270C SIM
Benzo(a) pyrene	2.7	2.5	ng/L	SW846 8270C SIM
Benzo(e) pyrene	4.5	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	4.9 J	5.2	ng/L	SW846 8270C SIM
Carbazole	5.2	3.8	ng/L	SW846 8270C SIM
Dibenzothiophene	1.4 J	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	3.9 Л	5.0	ng/L	SW846 8270C SIM
Fluoranthene	11	4.6	ng/L	SW846 8270C SIM
Indene	5.1	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	2.3 J	5.4	ng/L	SW846 8270C SIM
Naphthalene	16	8.6	ng/L	SW846 8270C SIM
Phenanthrene	11	6.3	ng/L	SW846 8270C SIM
Pyrene	16	4.2	ng/L	SW846 8270C SIM

# **METHODS SUMMARY**

## D3B200234

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD	
Base/Neutrals and Acids	SW846 8270C SIM	SW846 3520C	

# References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# METHOD / ANALYST SUMMARY

# D3B200234

ANALYTICAL				
METHOD	ANALYST	ID		
SW846 8270C SIM	Tim O'Donnell	000443		

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

#### D3E200234

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FN3JP	001	W133-051903	05/19/03	11:55
FN3J4	002	W411-051903	05/19/03	11:20
FN3J5	003	W122-051903	05/19/03	14:30
FN3J6	004	W412-051903	05/19/03	15:45
FN3J8	005	W412FB-051903	05/19/03	15:35
FN3KA	006	W412FBD-051903	05/19/03	15:40
FN3KG	007	SLP3-051903	05/19/03	11:00
FN3KP	800	SLP3D-051903	05/19/03	11:15

## NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: W133-051903

# GC/MS Semivolatiles

Lot-Sample #: D3E200234-001	Work Order #:	FN3JP1AA	Matrix: WG
Date Sampled: 05/19/03	Date Received:	05/20/03	
Prep Date: 05/23/03	Analysis Date:	06/16/03	
Prep Batch #: 3143185	Analysis Time:	22:14	
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	7.7	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	6.7	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a)anthracene	ND	4.3	ng/L
Benzo (b) fluoranthene	1.4 J	4.7	ng/L
Benzo(k)fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	1.9 J	6.2	ng/L
Benzo (a) pyrene	1.2 J	2.5	ng/L
Benzo (e) pyrene	1.4 J	4.3	ng/L
Benzo (b) thiophene	5.1 J	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	2.7 J	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	1.0 J	4.1	ng/L
2,3-Dihydroindene	15	5.0	ng/L
Fluoranthene	<b>5.4</b>	4.6	ng/L
Fluorene	3.0 J	4.1	ng/L
Indene	8.0	4.7	ng/L
Indeno(1,2,3-cd)pyrene	1.4 J	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	13	5.9	ng/L
1-Methylnaphthalene	9.8	5.6	ng/L
Naphthalene	21	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	7.8	6.3	ng/L

4.2

9.0

ng/L

ng/L

	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	12 *	(30 - 118)		
Fluorene d-10	41	(41 - 162)		
Naphthalene-d8	50	(30 - 108)		

6.0

ND

#### NOTE(S):

Pyrene

Quinoline

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W411-051903

# GC/MS Semivolatiles

Lot-Sample #: D3E200234-002 Date Sampled: 05/19/03 Prep Date: 05/23/03 Prep Batch #: 3143185 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	05/20/03 06/16/03	Matrix: WG
	Method:	SW846 8270	C SIM
D & D & MOVIDED	Draw m	REPORTING	INITEC
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	18 ND	5.7 4.8	ng/L ng/L
Acenaphthylene Acridine	_	6.2	ng/L
Anthracene	6.8 ND	4.2	ng/L
Benzo (a) anthracene	ND 11	4.2	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	4.4 J	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	2.5 J	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	6.6	3.8	ng/L
Chrysene	23	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	4.6 J	5.0	ng/L
Fluoranthene	7.8	4.6	ng/L
Fluorene	2.6 Ј	4.1	ng/L
Indene	4.9	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	7.3	5.9	ng/L
1-Methylnaphthalene	5.8	5.6	ng/L
Naphthalene	15	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	12	6.3	ng/L
Pyrene	19	4.2	ng/L
Quinoline	ND	9.0	ng/L
_			•
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	20 *	(30 - 118)	
Fluorene d-10	48	(41 - 162)	
Naphthalene-d8	43	(30 - 108)	

# NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W122-051903

# GC/MS Semivolatiles

Lot-Sample #: D3E200234-003	Work Order #:	FN3.751 AA	Matrix WG
Date Sampled: 05/19/03	Date Received:		
Prep Date: 05/23/03	Analysis Date:		
Prep Batch #: 3143185	Analysis Time:		
Dilution Factor: 1	Analysis iluc:	23:30	
DITULION FACCOI: 1	Method:	CW946 9270	C STM
	PECHOG	5#040 0270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	5.2 J	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	7.2	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	5.4 J	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	2.8 Ј	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	3.4 J	3.8	ng/L
Chrysene	16	5.6	ng/L
Dibenzo (a, h) anthracene	ИD	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	3.3 J	5.0	ng/L
Fluoranthene	4.6	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	4.4 Ј	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	5.4 J	5.9	ng/L
1-Methylnaphthalene	3.6 J	5.6	ng/L
Naphthalene	11	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	8.8	6.3	ng/L
Pyrene	20	4.2	ng/L
Quinoline	ND	9.0	ng/L
<del></del>			<b>-</b>
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	23 *	(30 - 118)	•
Fluorene d-10	46	(41 - 162)	
Naphthalene-d8	47	(30 - 108)	
	<del>-</del> /	/	

# NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W412-051903

# GC/MS Semivolatiles

Lot-Sample #: D3E200234-004			Matrix WG
Date Sampled: 05/19/03	Date Received:		
Prep Date: 05/23/03	Analysis Date:		
Prep Batch #: 3143185	Analysis Time:	00:08	
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
		DEDODETNO	
DAD AMORED	DECIII T	REPORTING	UNITS
PARAMETER	RESULT	LIMIT	<del></del>
Acenaphthene	ND	5.7 4.8	ng/L
Acenaphthylene	ND	6.2	ng/L
Acridine	2.7 J		ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo (b) fluoranthene	2.6 J	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	4.3 J	6.2	ng/L
Benzo (a) pyrene	2.7	2.5	ng/L
Benzo (e) pyrene	4.5	4.3	ng/L
Benzo (b) thiophene	4.9 J	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	5.2	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	1.4 J	4.1	ng/L
2,3-Dihydroindene	3.9 Ј	5.0	ng/L
Fluoranthene	11	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	5.1	4.7	ng/L
Indeno (1,2,3-cd) pyrene	2.3 Ј	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	16	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	11	6.3	ng/L
Pyrene	16	4.2	ng/L
Ouinoline	ND	9.0	ng/L
Autiottic	110	J.0	**3/ ~
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	13 *	(30 - 118)	•
Fluorene d-10	41	(41 - 162)	
Yanking and do	24	(20 100)	

34

(30 - 108)

# NOTE (S):

Naphthalene-d8

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W412FB-051903

# GC/MS Semivolatiles

Lot-Sample #:	D3E200234-005	Work Or	rder #	:	FN3J81AA	Matrix WG
				-		

 Date Sampled...:
 05/19/03
 Date Received...:
 05/20/03

 Prep Date.....:
 05/23/03
 Analysis Date...:
 06/17/03

 Prep Batch #...:
 3143185
 Analysis Time...:
 00:46

Dilution Factor: 1

Method.....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k)fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno (1,2,3-cd) pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
l-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Ouinoline	ND	9.0	ng/L
<b></b>			-31 -
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	67	(30 - 118)	<b>-</b> 1
Fluorene d-10	39 *	(41 - 162)	
Naphthalene-d8	36	(30 - 108)	

# NOTE(S):

Surrogate recovery is outside stated control limits.

# Client Sample ID: W412FBD-051903

# GC/MS Semivolatiles

Lot-Sample #: Date Sampled: Prep Date: Prep Batch #: Dilution Factor:	05/19/03 05/23/03 3143185	Work Order #: Date Received: Analysis Date: Analysis Time:	05/20/03 06/17/03	Matrix WG
		Method:	SW846 8270C S	EIM

		REPORTING	G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ממ	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	50	(30 - 11)	<del>(B)</del>
Fluorene d-10	36 *	(41 - 16)	
Naphthalene-d8	46	(30 - 10)	•
b		,	<del>-</del> ,

# NOTE(S):

Surrogate recovery is outside stated control limits.

# Client Sample ID: SLP3-051903

# GC/MS Semivolatiles

 Date Sampled...:
 05/19/03
 Date Received...:
 05/20/03

 Prep Date.....:
 05/23/03
 Analysis Date...:
 06/16/03

 Prep Batch #...:
 3143185
 Analysis Time...:
 20:19

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTING	<b>:</b>
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	31	(30 - 118	3)
Fluorene d-10	59	(41 - 162	)

# Client Sample ID: SLP3D-051903

# GC/MS Semivolatiles

Lot-Sample #: D3E200234-008	Work Order #: FN3KP1AA	Matrix WG
-----------------------------	------------------------	-----------

 Date Sampled...:
 05/19/03
 Date Received...:
 05/20/03

 Prep Date.....:
 05/23/03
 Analysis Date...:
 06/17/03

 Prep Batch #...:
 3143185
 Analysis Time...:
 13:51

Dilution Factor: 1

Method.....: SW846 8270C SIM

		DEDODMING	
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo (b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	מא	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Ouinoline	ND	9.0	ng/L
	<del></del>	- · ·	5/
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	25 *	(30 - 118)	•
Fluorene d-10	40 *	(41 - 162)	•
Naphthalene-d8	47	(30 - 108)	•
_			

Surrogate recovery is outside stated control timits.

NOTE(S):

# QC DATA ASSOCIATION SUMMARY

# D3E200234

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3143185	3143064
002	WG	SW846 8270C SIM		3143185	3143064
003	WG	SW846 8270C SIM		3143185	3143064
004	WG	SW846 8270C SIM		3143185	3143064
005	WG	SW846 8270C SIM		3143185	3143064
006	WG	SW846 8270C SIM		3143185	3143064
007	WG	SW846 8270C SIM		3143185	3143064
800	WG	SW846 8270C SIM		3143185	3143064

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E200234 Work Order #...: FN92P1AA Matrix.....: WATER

MB Lot-Sample #: D3E230000-185

Prep Date....: 05/23/03 Analysis Time..: 19:02

Analysis Date..: 06/16/03 Prep Batch #...: 3143185

Dilution Factor: 1

		REPORTIN	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo (a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo(a)pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
Chrysene	ND	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5 <b>.6</b>	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY	7	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	70	(30 - 11	L8)	
Fluorene d-10	47	(41 - 16	52)	
Naphthalene-d8	58	(30 - 10	)8)	

# LABORATORY CONTROL SAMPLE EVALUATION REPORT

Part Control

#### GC/MS Semivolatiles

Client Lot #...: D3E200234 Work Order #...: FN92P1AC Matrix.....: WATER

LCS Lot-Sample#: D3E230000-185

 Prep Date....:
 05/23/03
 Analysis Date..:
 06/16/03

 Prep Batch #...:
 3143185
 Analysis Time..:
 19:41

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	83	(30 - 150)	SW846 8270C SIM
hrysene	72	(30 - 132)	SW846 8270C SIM
luorene	64	(30 - 132)	SW846 8270C SIM
Indene	68	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	65	(30 - 150)	SW846 8270C SIM
Naphthalene	74	(30 - 150)	SW846 8270C SIM
Quinoline	55	(30 - 150)	SW846 8270C SIM
		PERCENT	RECOVERY
JRROGATE		RECOVERY	LIMITS
hrysene-d12	-	76	(30 - 118)
luorene d-10		54	(41 - 162)
aphthalene-d8		64	(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E200234 Work Order #...: FN92PlAC Matrix...... WATER

LCS Lot-Sample#: D3E230000-185

 Prep Date.....:
 05/23/03
 Analysis Date...:
 06/16/03

 Prep Batch #...:
 3143185
 Analysis Time...:
 19:41

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	10.0	8.26	ng/L	83	SW846 8270C S
Chrysene	10.0	7.18	ng/L	72	SW846 8270C S
Fluorene	10.0	6.44	ng/L	64	SW846 8270C S
Indene	10.0	6.82	ng/L	68	SW846 8270C S
2-Methylnaphthalene	10.0	6.50	ng/L	65	SW846 8270C S
Naphthalene	10.0	7.41	ng/L	74	SW846 8270C S
Quinoline	10.0	5.52	ng/L	55	SW846 8270C S
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS	_	
Chrysene-d12		76	(30 - 118)		
Fluorene d-10		54	(41 - 162)		
Naphthalene-d8		64	(30 - 108)		

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

### GC/MS Semivolatiles

Client Lot #...: D3E200234 Work Order #...: FN3KG1AC-MS Matrix..... WG

MS Lot-Sample #: D3E200234-007 FN3KG1AD-MSD

 Date Sampled...:
 05/19/03
 Date Received...:
 05/20/03

 Prep Date.....:
 05/23/03
 Analysis Date...:
 06/16/03

 Prep Batch #...:
 3143185
 Analysis Time...:
 20:57

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	10 a	(30 - 150)			SW846 8270C SIM
	13 a	(30 - 150)	29	(0-50)	SW846 8270C SIM
Chrysene	30	(30 - 132)			SW846 8270C SIM
_	33	(30 - 132)	13	(0-50)	SW846 8270C SIM
Fluorene	59	(30 - 132)			SW846 8270C SIM
	54	(30 - 132)	7.0	(0-50)	SW846 8270C SIM
Indene	56	(30 - 150)			SW846 8270C SIM
•	55	(30 - 150)	1.2	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	56	(30 - 150)			SW846 8270C SIM
	55	(30 - 150)	0.63	(0-50)	SW846 8270C SIM
Naphthalene	71	(30 - 150)			SW846 8270C SIM
	68	(30 - 150)	1.8	(0-50)	SW846 8270C SIM
Quinoline	58	(30 - 150)			SW846 8270C SIM
	57	(30 - 150)	0.73	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	_
Chrysene-d12	<del></del>	28 *		(30 - 118	<del>)</del>
		28 *		(30 - 118	)
Fluorene d-10		50		(41 - 162	)
		49		(41 - 162	)
Naphthalene-d8		54		(30 - 108	)
		56		(30 - 108	)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control timits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E200234 Work Order #...: FN3KG1AC-MS Matrix..... WG

MS Lot-Sample #: D3E200234-007 FN3KG1AD-MSD

 Date Sampled...:
 05/19/03
 Date Received..:
 05/20/03

 Prep Date....:
 05/23/03
 Analysis Date..:
 06/16/03

 Prep Batch #...:
 3143185
 Analysis Time..:
 20:57

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	MD	10.0	1.03	ng/L	10 a		SW846 8270C SIM
	ND	10.3	1.37	ng/L	13 a	29	SW846 8270C SIM
Chrysene	ND	10.0	2.99	ng/L	30		SW846 8270C SIM
	ND	10.3	3.39	ng/L	33	13	SW846 8270C SIM
Fluorene	ND	10.0	5.96	ng/L	59		SW846 8270C SIM
	ND	10.3	5.56	ng/L	54	7.0	SW846 8270C SIM
Indene	ND	10.0	5.66	ng/L	56		SW846 8270C SIM
	ND	10.3	5.73	ng/L	55	1.2	SW846 8270C SIM
2-Methylnaphthalene	ND	10.0	5.65	ng/L	56		SW846 8270C SIM
	ND	10.3	5.69	ng/L	55	0.63	SW846 8270C SIM
Naphthalene	ND	10.0	7.11	ng/L	71		SW846 8270C SIM
	ND	10.3	6.98	ng/L	68	1.8	SW846 8270C SIM
Quinoline	ND	10.0	5.80	ng/L	58		SW846 8270C SIM
	ND	10.3	5.84	ng/L	57	0.73	SW846 8270C SIM

PERCENT	RECOVERY			
RECOVERY	<u>LIMITS</u>			
28 *	(30 - 118)			
28 *	(30 - 118)			
50	(41 - 162)			
49	(41 - 162)			
54	(30 - 108)			
56	(30 - 108)			
	RECOVERY 28 * 28 * 50 49 54			

#### NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.



5/20/03



## Severn Trent Laboratories, Inc.

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## Chain of Custody Record

STL Denver 4955 Yarrow Street Arvada, CO 80002 5/20/a



Severn Trent Laboratories, Inc.

STL-4124 (0	(700) <b>DEN (0900)</b>																											
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#### **FULL VALIDATION**

STL Project # D3E200234 (J)

March 9, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

Full validation was performed on the data for the analyses of six aqueous samples and two field blanks for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on May 19, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL-Denver) in Arvada, CO for analysis. STL processed and reported the results under lot number D3E200234.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

Sample IDs	Sample IDs
W133-051903	W411-051903
W122-051903	W412-051903
W412FB-051903 (field blank)	W412FBD-051903 (field blank duplicate)
SLP3-051903	SLP3D-051903 (field duplicate of SLP3-051903)

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Initial and continuing calibrations
- Method blanks/field blanks
- Surrogate spike recoveries
- Internal standard performance
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results



- Compound quantitation
- Quantitation limits and sample results

#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory met the acceptance criteria of  $4^{\circ}$ C  $\pm$   $2^{\circ}$ C.

#### **Initial and Continuing Calibrations**

The percent relative standard deviations (%RSDs) and the response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration associated with all sample analyses.

The percent differences (%Ds) were within the QC acceptance criteria in the continuing calibration associated with all sample analyses.

#### Method Blanks/Field Blanks

Target analytes were not detected in the laboratory method blank, the field blank, W412FB-051903, or the field blank duplicate, W412FBD-051903.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses with the exception of those tabulated below.

Sample ID	Surrogate	%R	QC Limits (%R)
W122-051903	Chrysene-d <sub>12</sub>	12	30 – 118
W411-051903	Chrysene-d <sub>12</sub>	20	30 – 118
W122-051903	Chrysene-d <sub>12</sub>	23	30 – 118
W412-051903	Chrysene-d <sub>12</sub>	13	30 – 118
W412FB-051903	Fluorene-d <sub>10</sub>	39	41 - 162
W412FBD-051903	Fluorene-d <sub>10</sub>	36	41 - 162
SLP3D-051903	Chrysene-d <sub>12</sub>	25	30 – 118
SLP3D-051903	Fluorene-d <sub>10</sub>	40	41 - 162



Detected and non-detected results reported in sample SLP3D-051913 were qualified as estimated (J/UJ). No action was taken on the results from the other samples since only one of three surrogates were outside of the acceptance limits.

#### **Internal Standard Performance**

The internal standard performance was within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### **MS/MSD Results**

MS/MSD analyses were performed on sample SLP3-051903. All relative percent differences (RPDs) met the acceptance criteria. The following table summarizes the percent recoveries of the spiked target analytes which fell outside the QC acceptance limits. The non-detected result reported for benzo(e)pyrene in the native sample SLP3-051903 and its duplicate SLP3D-051903 were qualified as estimated (UJ) in these samples.

Compound	%R MS/MSD	QC Limits
Benzo(e)pyrene	10/13	30 - 150

#### **Field Duplicate Results**

Samples SLP3-051903 and SLP3D-051903 were submitted as the field duplicate samples with this data set. Target analytes were not detected in either sample.

#### **Compound Quantitation**

Sample results were spot-checked. No discrepancies were noted.

#### **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

The laboratory's reporting limits were compared with those specified in the QAPP. All laboratory limits were met the required reporting limits with the following exceptions:

Analyte	Laboratory Reporting Limit (ng/L)	QAPP Reporting Limit (ng/L)
Phenanthrene	6.3	4.7
Anthracene	4.2	3.4
Benzo(k)fluoranthene	4.1	3.9



## ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E210221

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 19, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
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<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> </ul>	<u> </u>
<ul> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> <li>Analytical Results</li> <li>QC Data Association Summary</li> <li>Chain-of-Custody</li> </ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
• Volatile GC	
• Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
• Subcontracted Data	

## CASE NARRATIVE D3E210221

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

#### Sample Receiving

Nine samples were received under chain of custody on May 21, 2003. The samples were received in good condition at temperatures of 2.1°C, 3.4°C, 2.7°C, 3.3°C, 3.9°C and 2.2°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Sample D3E210221-001 demonstrated a recovery of the surrogate chrysene-d12 of 20% that was below control limits. The other two surrogates are in control. This may indicate a low bias in the sample data; however no sample volume was left for reanalysis and no further corrective action was taken.

The MS/MSD performed on sample D3E200234-008 demonstrated recoveries that were below control limits for benzo (e) pyrene. The MSD demonstrated an additional recovery that was below control limits for indene.

No other anomalies were observed.

## Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETE	NESS CALC	ULATION							
LOT: D3E210221									
ANALYSIS:	PAHs by SV	V846-8270C							
QC Parameter	Data	Valid Data							
	Planned	Obtained							
Method Blank	31	31							
MB Surrogates	3	3							
LCS	7	7							
LCS Surrogates	3	3							
FB/FBD	62	62							
MS	7	6							
MS Surrogates	3	3							
MSD	7	5							
MSD Surrogates	3	3							
MS/MSD RPD	7	7							
Sample/Dup. RPD	31	31							
Sample Surrogates	27	26							
Samples and QC	39	39							
Internal Standard Area									
TOTAL	230	226							
% Completeness	98.3%								

<sup>\*</sup>A MS/MSD was performed on sample SLP4-052003.

## Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD	}				
LOT D3E210221					
Sample: SLP4-052003		DUP: SLP4D-052003			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	82	Acenaphthene	92	11.5	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	4.1	NC	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	8.5	Benzo(b)thiophene	9.3	9.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	6.8	Carbazole	7.7	12.4	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	86	2,3-Dihydroindene	95	9.9	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	30	Indene	33	9.5	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	DN	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	7.6	Pyrene	8.1	6.4	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3B210221

		REPORTING		ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
			•	
W402-052003 05/20/03 10:45 001				
Benzo(ghi)perylene	2.6 J	6.2	ng/L	SW846 8270C SIM
Benzo(e)pyrene	1.8 J	4.3	ng/L	SW846 8270C SIM
Carbazole	3.5 J	3.8	ng/L	SW846 8270C SIM
2,3-Dihydroindene	6.5	5.0	ng/L	SW846 8270C SIM
Fluoranthene	3.5 J	4.6	ng/L	SW846 8270C SIM
Indene	5.7	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	4.7 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	3.8 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	14	8.6	ng/L	SW846 8270C SIM
Pyrene	12	4.2	ng/L	SW846 8270C SIM
-			3, -	
W403-052003 05/20/03 12:45 004				
Benzo (a) anthracene	35	4.3	ng/L	SW846 8270C SIM
Benzo(b)fluoranthene	0.68 J	4.7	ng/L	SW846 8270C SIM
Benzo (b) thiophene	8.9	5.2	ng/L	SW846 8270C SIM
Carbazole	4.4	3.8	ng/L	SW846 8270C SIM
Chrysene	89	5.6	ng/L	SW846 8270C SIM
2,3-Dihydroindene	5.2	5.0	ng/L	SW846 8270C SIM
Fluorene	3.2 J	4.1	ng/L	SW846 8270C SIM
Indene	6.9	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	4.2 J	5.9	ng/L	SW846 8270C SIM
Naphthalene	14	8.6	ng/L	SW846 8270C SIM
Phenanthrene	14	6.3	ng/L	SW846 8270C SIM
Pyrene	4.7	4.2	ng/L	SW846 8270C SIM
W29-052003 05/20/03 13:00 005				
Acenaphthene	31	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	1.9 Л	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	5.8	5.0	ng/L	SW846 8270C SIM
Fluoranthene	8.2	4.6	ng/L	SW846 8270C SIM
Fluorene	3.9 J	4.1	ng/L	SW846 8270C SIM
Pyrene	11	4.2	ng/L	SW846 8270C SIM
-				
W48-052003 05/20/03 14:45 006				
Acenaphthene	78	5.7	ng/L	SW846 8270C SIM
Acridine	17	6.2	ng/L	SW846 8270C SIM
Benzo(b) thiophene	6.4	5.2	ng/L	SW846 8270C SIM
Dibenzothiophene	5.6	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	9.2	5.0	ng/L	SW846 8270C SIM
Indene	15	4.7	ng/L	SW846 8270C SIM
			<b>J</b> ,	

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3B210221

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W48-052003 05/20/03 14:45 006				
Pyrene	4.0 J	4.2	ng/L	SW846 8270C SIM
SLP4-052003 05/20/03 12:00 008				
Acenaphthene	82	5.7	ng/L	SW846 8270C SIM
Benzo(b) thiophene	8.5	5.2	ng/L	SW846 8270C SIM
Carbazole	6.8	3.8	ng/L	SW846 8270C SIM
2,3-Dihydroindene	86	5.0	ng/L	SW846 8270C SIM
Indene	30	4.7	ng/L	SW846 8270C SIM
Pyrene	7.6	4.2	ng/L	SW846 8270C SIM
SLP4D-052003 05/20/03 12:10 009				
Acenaphthene	92	5.7	ng/L	SW846 8270C SIM
Acridine	4.1 J	6.2	ng/L	SW846 8270C SIM
Benzo(b) thiophene	9.3	5.2	ng/L	SW846 8270C SIM
Carbazole	7.7	3.8	ng/L	SW846 8270C SIM
2,3-Dihydroindene	95	5.0	ng/L	SW846 8270C SIM
Indene	33	4.7	ng/L	SW846 B270C SIM
Pyrene	8.1	4.2	ng/L	SW846 8270C SIM

## **METHODS SUMMARY**

#### D3B210221

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

Base/Neutrals and Acids SW846 8270C SIM SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **METHOD / ANALYST SUMMARY**

#### D3B210221

ANALYTICAL		ANALYST
METHOD	ANALYST	ID
SW846 8270C SIM	Tim O'Donnell	000443

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

#### D3B210221

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FN5NG	001	W402-052003	05/20/03	10:45
FN5NR	002	W402FB-052003	05/20/03	10:35
FN5NT	003	W402FBD-052003	05/20/03	10:40
FN5NW	004	W403-052003	05/20/03	12:45
FN5N2	005	W29-052003	05/20/03	13:00
FN5N4	006	W48-052003	05/20/03	14:45
FN5N5	007	W70-052003	05/20/03	16:15
FN5N6	800	SLP4-052003	05/20/03	12:00
FN5N7	009	SLP4D-052003	05/20/03	12:10

## NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

## Client Sample ID: W402-052003

## GC/MS Semivolatiles

Lot-Sample #: D3E210221-001	Work Order #: FN5NG1AA	<b>Matrix</b> : WG
Date Sampled: 05/20/03	Date Received: 05/21/03	
Prep Date: 05/26/03	Analysis Date: 06/17/03	
Prep Batch #: 3146097	Analysis Time: 14:29	

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	2.6 J	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo (e) pyrene	1.8 J	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	3.5 J	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	6.5	5.0	ng/L
Fluoranthene	3.5 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	5 <b>.7</b>	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	4.7 J	5.9	ng/L
1-Methylnaphthalene	3.8 J	5.6	ng/L
Naphthalene .	14	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	12	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	20 *	(30 - 118)	
Fluorene d-10	42	(41 - 162)	
Naphthalene-d8	51	(30 - 108)	

NOTE	(S)	•

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

## Client Sample ID: W402FB-052003

## GC/MS Semivolatiles

Lot-Sample #:	D3E210221-002	Work Order #: FN5NR1AA	Matrix WG
Date Sampled:	05/20/03	Date Received: 05/21/03	

 Prep Date....:
 05/26/03
 Analysis Date..:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time..:
 15:07

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTIN	'G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Siphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
,3-Dihydroindene	ND	5.0	ng/L
luoranthene	ND	4.6	ng/L
luorene	ND	4.1	ng/L
indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
;	•1 <b>~</b>	J.0	
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	57	(30 - 11	8)
Fluorene d-10	42	(41 - 16	
Naphthalene-d8	49	(30 - 10	•
		,50 10	-,

#### Client Sample ID: W402FBD-052003

## GC/MS Semivolatiles

Lot-Sample #: D3E210221-00	Work Order #: FN5NT1AA	Matrix WG
----------------------------	------------------------	-----------

Date Sampled...: 05/20/03 Date Received..: 05/21/03 Prep Date....: 05/26/03 Analysis Date..: 06/17/03 Prep Batch #...: 3146097 Analysis Time..: 15:46

Dilution Factor: 1

Method.....: SW846 8270C SIM

	•	REPORTIN	_
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
cenaphthylene	ND	4.8	ng/L
cridine	ND	6.2	ng/L
nthracene	ND	4.2	ng/L
enzo (a) anthracene	ND	4.3	ng/L
enzo(b)fluoranthene	ND	4.7	ng/L
enzo(k)fluoranthene	ND	4.1	ng/L
,3-Benzofuran	ND	5.4	ng/L
enzo(ghi)perylene	ND	6.2	ng/L
enzo(a)pyrene	ND	2.5	ng/L
enzo(e)pyrene	ND	4.3	ng/L
enzo(b)thiophene	ND	5.2	ng/L
phenyl	ND	5.6	ng/L
arbazole	ND	3.8	ng/L
nrysene	ND	5.6	ng/L
benzo (a,h) anthracene	ND	5.9	ng/L
benzofuran	ND	5.7	ng/L
benzothiophene	ND	4.1	ng/L
3-Dihydroindene	ND	5.0	ng/L
uoranthene	ND	4.6	ng/L
uorene	ND	4.1	ng/L
dene	ND	4.7	ng/L
deno(1,2,3-cd)pyrene	ND	5.4	ng/L
dole	ND	4.7	ng/L
Methylnaphthalene	ND	5.9	ng/L
Methylnaphthalene	ND	5.6	ng/L
phthalene	ND	8.6	ng/L
erylene	ND	3.3	ng/L
enanthrene	ND	6.3	ng/L
rene	ND	4.2	ng/L
inoline	ND	9.0	ng/L
	PERCENT	RECOVERY	•
JRROGATE	RECOVERY	LIMITS	
rysene-d12	64	(30 - 11	8)
luorene d-10	43	(41 - 16	2)
phthalene-d8	48	(30 - 10	8)

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	64	(30 - 118)
Fluorene d-10	43	(41 - 162)
Naphthalene-d8	48	(30 - 108)

## Client Sample ID: W403-052003

## GC/MS Semivolatiles

Lot-Sample #: D3E210221-004	Work Order #:	FN5NW1AA	Matrix WG
Date Sampled: 05/20/03	Date Received:		
Prep Date: 05/26/03	Analysis Date:	• •	
Prep Batch #: 3146097	Analysis Time:		
Dilution Factor: 1	-		
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	35	4.3	ng/L
Benzo (b) fluoranthene	0.68 J	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	8.9	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	4.4	3.8	ng/L
Chrysene	89	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	5.2	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	3.2 J	4.1	ng/L
Indene	6.9	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	4.2 J	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	14	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	14	6.3	ng/L
Pyrene	4.7	4.2	ng/L
Quinoline	ND	9.0	ng/L
•			<del>-</del>
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	40	(30 - 118)	
Fluorene d-10	43	(41 - 162)	
Naphthalene-d8	49	(30 ~ 108)	

NOTE (S):

J Estimated result. Result is less than RL.

## Client Sample ID: W29-052003

## GC/MS Semivolatiles

Lot-Sample #:	D3E210221-005	Work Order #	: FN5N21AA	Matrix	.: WG
TOUR DUMPLE B	DODELLARE COO	MOTE OTHER A	· · LII VII C TIMI	1-262	

 Date Sampled...:
 05/20/03
 Date Received...:
 05/21/03

 Prep Date.....:
 05/26/03
 Analysis Date...:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time...:
 17:02

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	31	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	1.9 J	4.1	ng/L
2,3-Dihydroindene	5.8	5.0	ng/L
Fluoranthene	8.2	4.6	ng/L
Fluorene	3.9 J	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	11	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	30	(30 - 11	8)
Fluorene d-10	57	(41 - 16	2)
Naphthalene-d8	59	(30 - 10	8)

NOTE (S) :

J Estimated result. Result is less than RL.

## Client Sample ID: W48-052003

## GC/MS Semivolatiles

Lot-Sample #: D3E210221-006 Date Sampled: 05/20/03 Prep Date: 05/26/03 Prep Batch #: 3146097 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	05/21/03 06/17/03	Matrix WG
	Method:	SW846 8270	C SIM
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	78	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	17	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	6.4	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	5.6	4.1	ng/L
2,3-Dihydroindene	9.2	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	15	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Dhanasthrono	ATTS	6 2	75 /T

3.3 6.3

4.2

9.0

ng/L

ng/L

ng/L

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	48	(30 - 118)
Fluorene d-10	112	(41 - 162)
Naphthal <i>e</i> ne-d8	55	(30 - 108)

ND

ND

4.0 J

#### NOTE(S):

Phenanthrene

Pyrene

Quinoline

J Estimated result. Result is less than RL.

#### Client Sample ID: W70-052003

#### GC/MS Semivolatiles

Lot-Sample #...: D3E210221-007 Work Order #...: FN5N51AA Matrix...... WG

 Date Sampled...:
 05/20/03
 Date Received..:
 05/21/03

 Prep Date.....:
 05/26/03
 Analysis Date..:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time..:
 18:18

Dilution Factor: 1

Fluorene d-10

Naphthalene-d8

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e) pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND ·	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND .	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	33	(30 - 118	)

(41 - 162)

(30 - 108)

52

56

## Client Sample ID: SLP4-052003

## GC/MS Semivolatiles

Lot-Sample #:	D3E210221-008	Work Order #: FN5N63	AA Matrix WG
Date Sampled:	05/20/03	Date Received: 05/21/	03

 Prep Date.....: 05/26/03
 Analysis Date..: 06/17/03

 Prep Batch #...: 3146097
 Analysis Time..: 18:56

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTIN	īG
PARAMETER	RESULT	LIMIT	UNITS _
Acenaphthene	82	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k)fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	8.5	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	6.8	3.8	ng/L
Chrysene	ND	5.6	ng/L
ibenzo (a, h) anthracene	ND	5.9	ng/L
ibenzofuran	ND	5.7	ng/L
ibenzothiophene	ND	4.1	ng/L
,3-Dihydroindene	86	5.0	ng/L
luoranthene	ND	4.6	ng/L
luorene	ND	4.1	ng/L
ndene	30	4.7	ng/L
indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
indole	ND	4.7	ng/L
-Methylnaphthalene	ND	5.9	ng/L
-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	7.6	4.2	ng/L
uinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	37	(30 - 11	8)
Fluorene d-10	47	(41 - 16	·
Naphthalene-d8	52	(30 - 10	
abitation and		,50 10	-,

## Client Sample ID: SLP4D-052003

## GC/MS Semivolatiles

Lot-Sample #:	D3E210221-009	Work Order #:	FN5N71AA	Matrix: WG

 Date Sampled...:
 05/20/03
 Date Received..:
 05/21/03

 Prep Date....:
 05/26/03
 Analysis Date..:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time..:
 20:50

Dilution Factor: 1

Method.....: SW846 8270C SIM

		REPORTING	_
PARAMETER	RESULT	<u>LIMIT</u>	UNITS
Acenaphthene	92	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	4.1 J	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	9.3	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	<b>7</b> .7	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	95	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	33	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
l-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	8.1	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	34	(30 - 11)	B}
Fluorene d-10	54	(41 - 16)	2)
Naphthalene-d8	61	(30 - 10)	3)

NOTE (S):

J Estimated result. Result is less than RL.

# QC DATA ASSOCIATION SUMMARY

## D3B210221

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3146097	3146005
002	WG	SW846 8270C SIM		3146097	3146005
003	WG	SW846 8270C SIM		3146097	3146005
004	WG	SW846 8270C SIM		3146097	3146005
005	WG	SW846 8270C SIM		3146097	3146005
006	WG	SW846 8270C SIM		3146097	3146005
007	WG	SW846 8270C SIM		3146097	3146005
800	WG	SW846 8270C SIM		3146097	3146005
009	WG	SW846 8270C SIM		3146097	3146005

#### METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E210221 Work Order #...: FPEPL1AA Matrix.....: WATER

MB Lot-Sample #: D3E260000-097

Prep Date....: 05/26/03 Analysis Time..: 11:17

Analysis Date..: 06/17/03 Prep Batch #...: 3146097

Dilution Factor: 1

		REPORTI	NG	
PARAMETER	RESULT	LIMIT	UNITS _	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo (a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 B270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo(a)pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
hrysene	ND	5.6	ng/L	SW846 8270C SIM
Jibenzo (a, h) anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY	Y	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	67	(30 - 13	18)	
Fluorene d-10	54	(41 - 16	52)	
Naphthalene-d8	66	(30 - 10	08)	

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E210221 Work Order #...: FPEPL1AC Matrix.....: WATER

LCS Lot-Sample#: D3E260000-097

Prep Date....: 05/26/03 Analysis Date..: 06/17/03
Prep Batch #...: 3146097 Analysis Time..: 11:56

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	71	(30 - 150)	SW846 8270C SIM
Chrysene	5 <b>6</b>	(30 - 132)	SW846 8270C SIM
Fluorene	59	(30 - 132)	SW846 8270C SIM
Indene	55	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	57	(30 - 150)	SW846 8270C SIM
Naphthalene	65	(30 - 150)	SW846 8270C SIM
Quinoline	67	(30 - 150)	SW846 8270C SIM
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		60	(30 - 118)
Fluorene d-10		50	(41 - 162)
Naphthalene-d8		60	(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E210221 Work Order #...: FPEPL1AC Matrix...... WATER

LCS Lot-Sample#: D3E260000-097

 Prep Date.....:
 05/26/03
 Analysis Date..:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time..:
 11:56

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	10.0	7.07	ng/L	71	SW846 8270C S
Chrysene	10.0	5.59	ng/L	56	SW846 8270C S
Fluorene	10.0	5.90	ng/L	59	SW846 B270C S
Indene	10.0	5.53	ng/L	55	SW846 8270C S
2-Methylnaphthalene	10.0	5.66	ng/L	57	SW846 B270C S
Naphthalene	10.0	6.52	ng/L	65	SW846 8270C S
Quinoline	10.0	6.70	ng/L	67	SW846 8270C S

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	60	(30 - 118)
Fluorene d-10	50	(41 - 162)
Naphthalene-d8	60	(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E210221 Work Order #...: FN5N61AC-MS Matrix...... WG

MS Lot-Sample #: D3E210221-008 FN5N61AD-MSD

 Date Sampled...:
 05/20/03
 Date Received...:
 05/21/03

 Prep Date.....:
 05/26/03
 Analysis Date...:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time...:
 19:34

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	26 a	(30 - 150)			SW846 8270C SIM
	28 a	(30 - 150)	6.6	(0-50)	SW846 8270C SIM
Chrysene	33	(30 - 132)			SW846 8270C SIM
	34	(30 - 132)	0.09	(0-50)	SW846 8270C SIM
Fluorene	62	(30 - 132)			SW846 8270C SIM
	61	(30 - 132)	3.6	(0-50)	SW846 8270C SIM
Indene	58	(30 - 150)			SW846 8270C SIM
	25 a	(30 - 150)	9.4	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	56	(30 - 150)			SW846 8270C SIM
	54	(30 - 150)	4.4	(0-50)	SW846 8270C SIM
Naphthalene	79	(30 ~ 150)			SWB46 8270C SIM
	74	(30 - 150)	B.0	(0-50)	SW846 8270C SIM
Quinoline	64	(30 - 150)			SW846 8270C SIM
	65	(30 - 150)	0.68	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	_
Chrysene-d12		35		(30 - 118	1)
		32		(30 - 118	1)
Fluorene d-10		50		(41 - 162	1)
		49		(41 - 162	!)
Naphthalene-d8		54		(30 - 108	1)
		48		(30 - 108	)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

## MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3E210221 Work Order #...: FN5N61AC-MS Matrix.....: WG

MS Lot-Sample #: D3E210221-008 FN5N61AD-MSD

 Date Sampled...:
 05/20/03
 Date Received..:
 05/21/03

 Prep Date....:
 05/26/03
 Analysis Date..:
 06/17/03

 Prep Batch #...:
 3146097
 Analysis Time..:
 19:34

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	9.73	2.53	ng/L	26 a		SW846 8270C SIM
	MD	9.65	2.70	ng/L	28 a	6.6	SW846 8270C SIM
Chrysene	ND	9.73	3.26	ng/L	33		SW846 8270C SIM
	ND	9.65	3.26	ng/L	34	0.09	SW846 8270C SIM
Fluorene	ND	9.73	6.08	ng/L	62		SW846 8270C SIM
	ND	9.65	5.86	ng/L	61	3.6	SW846 8270C SIM
Indene	30	9.73	35.1	ng/L	58		SW846 8270C SIM
	30	9.65	32.0	ng/L	25 a	9.4	SW846 8270C SIM
2-Methylnaphthalene	ND	9.73	5.48	ng/L	56		SW846 8270C SIM
	ND	9.65	5.24	ng/L	54	4.4	SW846 8270C SIM
Naphthalene	ND	9.73	7.72	ng/L	79		SW846 8270C SIM
	ND	9.65	7.13	ng/L	74	8.0	SW846 8270C SIM
Quinoline	ND	9.73	6.23	ng/L	64		SW846 8270C SIM
	ND	9.65	6.27	ng/L	65	0.68	SW846 8270C SIM

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	35	(30 - 118)
	32	(30 - 118)
Fluorene d-10	50	(41 - 162)
	49	(41 - 162)
Naphthalene-d8	54	(30 - 108)
	48	(30 - 108)

#### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record

5/41/0



## Severn Trent Laboratories, Inc.

STL-4124 (0901)	<u>.                                      </u>												_										_
City of St. Louis Par	k	Project I	المح	l	4nd									<u> </u>	ate 5	20	0	3	Cha	in of Custody 15	074	6	_
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# Chair of Custody Record

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## Severn Trent Laboratories, Inc.

STL-4124 (	0901)																											
Client	1		Project Manager																						Chain of Custody Number			
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#### **DATA QUALITY ASSESSMENT**

STL Project # D3E210221 (K)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of nine aqueous samples for parts per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on May 20, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E210221.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W402-052003

W402FB-052003

W402FBD-052003

W403-052003

W29-052003

W48-052003

W70-052003

SLP4-052003

SLP4D-052003

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results



- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory ranged from 2.1°C to 3.9°C. The cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

The method blank for this data package was 3146097. Target analytes were not detected in the laboratory method blank. In addition to the method blanks, a field blank and field blank duplicate were also submitted with this data set. Samples W402FB-052003 and W402FBD-052003 did not have any of the target analytes detected.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses except for sample W402-052003. Recoveries for chrysene-d12 were outside the range of 30-118%. The other two surrogates were in control for this sample.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed for this data set. Sample SLP4-052003 had percent recoveries and relative percent differences (RPDs) within the acceptable range except for the compounds benzo(e)pyrene and indene. The percent recoveries for benzo(e)pyrene was 26% and 28% for the MS/MSD and fell outside the range of 30-150. The RPD was within an acceptable range. Indene was found at a concentration of 25% in the MSD.



Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	26/28	ok	30-150/0-50
Indene	ok/25	ok	30-150/0-50

#### **Field Duplicate Results**

A duplicate sample was submitted for SLP4-052003 with this data set. A total of six out of 31 target analytes were detected in the samples. The percent recoveries and RPDs were within range for all analytes. It should be noted that one compound was detected in the duplicate sample, but was not detected in the primary sample. The data are acceptable because the positive result was less than 4x the reporting limit for that compound (acridine).

#### **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

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#### **ANALYTICAL REPORT**

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3E280223

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

June 26, 2003

# **Table Of Contents**

## Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
Table of Contents	
Case Narrative	
<ul> <li>Executive Summary – Detection Highlights</li> </ul>	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
Chain-of-Custody	
- Call of Callogy	Check below when
Supporting Documentation	supporting
(Note: A one-page "Description of Supporting Documentation" is	documentation is
provided at the beginning of this section.).	present.
Volatile GC/MS	
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# CASE NARRATIVE D3E280223

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

#### Sample Receiving

Six samples were received under chain of custody on May 28, 2003. The samples were received in good condition at temperatures of 4.7°C, 4.6°C, 4.9°C, and 4.2°C.

#### GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3E280223-002, 005, and 006 demonstrated recoveries of the surrogate chrysene-d12 below control limits at 22%, 25%, and 26% respectively. The other two surrogates are in control. This may indicate a low bias in the sample data; however no sample volume remains for reanalysis and no further corrective action was taken. Matrix effects are suspected, as demonstrated by low surrogate recoveries in sample 001 and the MS/MSD performed on sample 001.

The MS/MSD performed on sample D3E280223-001 demonstrated recoveries that were below control limits for benzo(e)pyrene and quinoline. Additionally, the surrogate chrysene-d12 was below control limits in the MSD.

No other anomalies were observed.

## **Data Completeness for Method 8270C SIM**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETE	NESS CALC	ULATION			
	LOT: D3E280223				
ANALYSIS: SW846-8270C SIM					
QC Parameter	Data	Valid Data			
	Planned	Obtained			
Method Blank	31	31			
MB Surrogates	3	3			
LCS	7	7			
LCS Surrogates	3	3			
FB/FBD	62	62			
MS	7	5			
MS Surrogates	3	3			
MSD	7	5			
MSD Surrogates	3	2			
MS/MSD RPD	7	6			
Sample/Dup. RPD	31	31			
Sample Surrogates	18	15			
Samples and QC	30	30			
Internal Standard Area					
TOTAL	212	203			
% Completeness	95.8%				

<sup>\*</sup>A MS/MSD was performed on sample GAC-SLP4T-052703

## Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD	1	1			
LOT D3E280223		· · · · · · · · · · · · · · · · · · ·	<del></del>	-	
Sample:	1	DUP:			
GAC-SLP4T-052703	!	GAC-SLP4TD-052703			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	ND	Acenaphthene	ND	0.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothlophene	ND	0.0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

## **EXECUTIVE SUMMARY - Detection Highlights**

#### D3E280223

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
GAC-SLP10T-052703 05/27/03 12:00 009	5			
Acenaphthene	9.6	5.7	ng/L	SW846 8270C SIM
2,3-Dihydroindene	5.7	5.0	ng/L	SW846 8270C SIM
PCJ-SLP6-052703 05/27/03 12:15 006				
Acenaphthene	74	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	12	4.8	ng/L	SW846 8270C SIM
Acridine	5.3 J	6.2	ng/L	SW846 8270C SIM
Benzo(b) thiophene	2.6 J	5.2	ng/L	SW846 8270C SIM
Dibenzothiophene	2.1 J	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	61	5.0	ng/L	SW846 8270C SIM
Fluorene	8.4	4.1	ng/L	SW846 8270C SIM

## **METHODS SUMMARY**

#### D3B280223

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

Base/Neutrals and Acids

SW846 8270C SIM SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **METHOD / ANALYST SUMMARY**

#### D3E280223

ANALYTICAL		ANALYST
METHOD	ANALYST	ID
SW846 8270C SIM	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

### SAMPLE SUMMARY

#### D3E280223

<u>wo #</u>	SAMPLE	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
<b>FPHHV</b>	001	GAC-SLP4T-052703	05/27/03	12:40
FPHH0	002	GAC-SLP4TD-052703	05/27/03	12:50
FPHH1	003	GAC-SLP4TFB-052703	05/27/03	13:20
FPHH2	004	GAC-SLP4TFBD-052703	05/27/03	12:30
FPHH3	005	GAC-SLP10T-052703	05/27/03	12:00
FPHH4	006	PCJ-SLP6-052703	05/27/03	12:15

### NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

#### Client Sample ID: GAC-SLP4T-052703

#### GC/MS Semivolatiles

Lot-Sample #:	D3E280223-001	Work Order	#: FPHHV1AA	Matrix:	WG
---------------	---------------	------------	-------------	---------	----

 Date Sampled...:
 05/27/03
 Date Received..:
 05/28/03

 Prep Date.....:
 06/02/03
 Analysis Date..:
 06/24/03

 Prep Batch #...:
 3153163
 Analysis Time..:
 21:21

Dilution Factor: 1

Method.....: SW846 8270C SIM

	PECHOL	: 50040 0270	COIN
		REPORTING	
PARAMETER	RESULT	<u>LIMIT</u>	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND .	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
			٥,
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	31	(30 - 118)	•
Fluorene d-10	47	(41 - 162)	
Naphthalene-d8	59	(30 - 108)	
	<del></del>	,== 200,	

## Client Sample ID: GAC-SLP4TD-052703

### GC/MS Semivolatiles

Lot-Sample #: D3E280223-002 Date Sampled: 05/27/03	Work Order #: FPHH01AA Date Received: 05/28/03	Matrix WG
Prep Date: 05/2//03	Analysis Date: 06/24/03	
Prep Batch #: 3153163 Dilution Factor: 1	Analysis Time: 23:15	

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	_
Dibenzo(a, n) anchracene Dibenzofuran	ND	5.7	ng/L
Dibenzoturan Dibenzothiophene	ND	4.1	ng/L ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene		4.6	<del></del>
Fluoranthene	ND ND	4.1	ng/L
Indene	ND	4.7	ng/L
	ND	4.7 5.4	ng/L
Indeno(1,2,3-cd)pyrene Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
_ <del>_</del>	ND		ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene		8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND ·	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
OTTO DOCUMENT			
SURROGATE	RECOVERY	LIMITS	-
Chrysene-d12	22 *	(30 - 118)	
Fluorene d-10	49	(41 - 162)	
Naphthalene-d8	61	(30 - 108)	)

## NOTE(S):

Surrogate recovery is outside stated control limits.

#### Client Sample ID: GAC-SLP4TFB-052703

#### GC/MS Semivolatiles

Lot-Sample #: D3E280223-003	Work Order #: FPHH11AA	Matrix WG
Data Campled . 05/27/02	Date Pegaired . 05/28/02	

 Date Sampled...:
 05/27/03
 Date Received...:
 05/28/03

 Prep Date....:
 06/02/03
 Analysis Date...:
 06/24/03

 Prep Batch #...:
 3153163
 Analysis Time...:
 23:53

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
cenaphthene	ND	5.7	ng/L
cenaphthylene	ND	4.8	ng/L
cridine	ND	6.2	ng/L
nthracene	ND	4.2	ng/L
enzo(a)anthracene	ND	4.3	ng/L
enzo(b)fluoranthene	ND	4.7	ng/L
enzo(k)fluoranthene	ND	4.1	ng/L
,3-Benzofuran	ND	5.4	ng/L
enzo(ghi)perylene	ND	6.2	ng/L
enzo(a)pyrene	ND .	2.5	ng/L
enzo(e)pyrene	ND	4.3	ng/L
enzo(b) thiophene	ND	5.2	ng/L
iphenyl	ND	5.6	ng/L
arbazole	ND	3.8	ng/L
hrysene	ND	5.6	ng/L
ibenzo (a, h) anthracene	ИD	5.9	ng/L
ibenzofuran	ND	5.7	ng/L
ibenzothiophene	ND	4.1	ng/L
3-Dihydroindene	ND	5.0	ng/L
uoranthene	ND	4.6	ng/L
uorene	ND	4.1	ng/L
idene	ND	4.7	ng/L
ideno(1,2,3-cd)pyrene	ND	5.4	ng/L
dole	ND	4.7	ng/L
Methylnaphthalene	ND	5.9	ng/L
-Methylnaphthalene	ND	5.6	ng/L
aphthalene	ND	8.6	ng/L
erylene	ND	3.3	ng/L
nenanthrene	ND	6.3	ng/L
yrene	ND	4.2	ng/L
uinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
URROGATE	RECOVERY	LIMITS	
arysene-d12	62	(30 - 118)	<del>-</del> 
luorene d-10	47	(41 - 162)	
aphthalene-d8	55	(30 - 108)	
Luciation ao	<b>~</b> -	(55 100)	

0.17

#### Client Sample ID: GAC-SLP4TFBD-052703

#### GC/MS Semivolatiles

Lot-Sample #...: D3E280223-004 Work Order #...: FPHH21AA Matrix...... WG

 Date Sampled...:
 05/27/03
 Date Received..:
 05/28/03

 Prep Date....:
 06/02/03
 Analysis Date..:
 06/25/03

 Prep Batch #...:
 3153163
 Analysis Time..:
 00:31

Dilution Factor: 1

Naphthalene-d8

Method.....: SW846 8270C SIM

		REPORTING	3
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo(e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5. <b>6</b>	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	NID	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	53	(30 - 118	3)
Fluorene d-10	41	(41 - 162	2)

54

(30 - 108)

## Client Sample ID: GAC-SLP10T-052703

## GC/MS Semivolatiles

Lot-Sample #: D3E280223-005	Work Order #: FPHH31AA	Matrix WG
Date Sampled: 05/27/03	Date Received: 05/28/03	
Prep Date: 06/02/03	Analysis Date: 06/25/03	
Prep Batch #: 3153163	Analysis Time: 01:09	
Dilution Factor: 1		
	Method SW846 8270C	STM

		REPORTIN	IG.
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	9.6	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	5.7	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno (1,2,3-cd) pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
l-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	5715 C		
CITADOCA ME	PERCENT	RECOVERY	;
SURROGATE	RECOVERY	LIMITS	<u></u>
Chrysene-d12	25 *	(30 - 11	
Fluorene d-10	45	(41 - 16	•
Naphthalene-d8	62	(30 - 10	191

NOIR	(S)	Z	

Surrogate recovery is outside stated control limits.

F-1

## Client Sample ID: PCJ-SLP6-052703

#### GC/MS Semivolatiles

Lot-Sample #: D	3E280223-006	Work Order #:	FPHH41AA	Matrix: WG

 Date Sampled...:
 05/27/03
 Date Received...:
 05/28/03

 Prep Date.....:
 06/02/03
 Analysis Date...:
 06/25/03

 Prep Batch #...:
 3153163
 Analysis Time...:
 01:47

Dilution Factor: 1

Method....: SW846 8270C SIM

PARAMETER   RESULT   LIMIT   UNITS
Acenaphthene         74         5.7         ng/L           Acenaphthylene         12         4.8         ng/L           Acridine         5.3 J         6.2         ng/L           Anthracene         ND         4.2         ng/L           Benzo (a) anthracene         ND         4.3         ng/L           Benzo (b) fluoranthene         ND         4.7         ng/L           Benzo (b) fluoranthene         ND         4.1         ng/L           Benzo (b) fluoranthene         ND         4.1         ng/L           Benzo (b) fluoranthene         ND         5.4         ng/L           Benzo (b) fluoranthene         ND         6.2         ng/L           Benzo (a) pyrene         ND         4.3         ng/L           Benzo (a) pyrene         ND         4.3         ng/L           Benzo (a) pyrene
Acenaphthylene         12         4.8         ng/L           Acridine         5.3 J         6.2         ng/L           Anthracene         ND         4.2         ng/L           Benzo (a) anthracene         ND         4.3         ng/L           Benzo (b) fluoranthene         ND         4.7         ng/L           Benzo (k) fluoranthene         ND         4.1         ng/L           Benzo (ghi) perylene         ND         5.4         ng/L           Benzo (ghi) perylene         ND         6.2         ng/L           Benzo (a) pyrene         ND         4.3         ng/L           Benzo (b) thiophene         2.6 J         5.2         ng/L           Benzo (a) pyrene         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.7         ng/L           Dibenzo (
Acridine 5.3 J 6.2 ng/L Anthracene ND 4.2 ng/L Benzo(a) anthracene ND 4.3 ng/L Benzo(b) fluoranthene ND 4.7 ng/L Benzo(k) fluoranthene ND 4.7 ng/L Benzo(k) fluoranthene ND 4.7 ng/L Benzo(k) fluoranthene ND 4.7 ng/L Benzo(ghi) perylene ND 5.4 ng/L Benzo(ghi) perylene ND 6.2 ng/L Benzo(a) pyrene ND 4.3 ng/L Benzo(b) thiophene 2.6 J 5.2 ng/L Biphenyl ND 5.6 ng/L Carbazole ND 3.8 ng/L Chrysene ND 5.6 ng/L Dibenzo(a, h) anthracene ND 5.9 ng/L Dibenzofuran ND 5.7 ng/L Dibenzothiophene 2.1 J 4.1 ng/L C,3-Dihydroindene 61 5.0 ng/L Fluoranthene ND 4.6 ng/L Fluorene 8.4 4.1 ng/L Indene ND 4.7 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.4 ng/L Indene ND 5.5 ng/L Indene ND 5.5 ng/L Indene ND 5.6 ng/L Indene ND 5.7 ng/L Indene ND 5.8 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.6 ng/L Indene ND 5.6 ng/L Pluorene ND 5.6 ng/L Indene ND 5.6 ng/L Indene ND 5.7 ng/L Indene ND 5.8 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Indene ND 5.9 ng/L Perylene ND 3.3 ng/L Phenanthrene ND 3.3 ng/L Phenanthrene ND 6.3 ng/L Phenanthrene ND 6.3 ng/L
Anthracene Benzo(a) anthracene Benzo(b) fluoranthene ND Benzo(k) fluoranthene ND Benzo(k) fluoranthene ND Benzo(k) fluoranthene ND Benzo(k) fluoranthene ND Benzo(ghi) perylene ND Benzo(ghi) perylene ND Benzo(a) pyrene ND Benzo(a) pyrene ND Benzo(b) thiophene Diphenyl ND Benzo(b) thiophene Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl ND Diphenyl D
Benzo (a) anthracene         ND         4 . 3         ng/L           Benzo (b) fluoranthene         ND         4 . 7         ng/L           Benzo (k) fluoranthene         ND         4 . 1         ng/L           Benzo (k) fluoranthene         ND         4 . 1         ng/L           2 . 3 - Benzo furan         ND         5 . 4         ng/L           Benzo (a) pyrene         ND         6 . 2         ng/L           Benzo (e) pyrene         ND         4 . 3         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 2         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 2         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 2         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 2         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 2         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 2         ng/L           Benzo (b) thiophene         2 . 6 J         5 . 6         ng/L           Carbacole         ND         3 . 8         ng/L           Dibenzo (a, h) anthracene         ND         5 . 7         ng/L           Dibenzo (a, h) anthracene         ND
Benzo (b) fluoranthene         ND         4.7         ng/L           Benzo (k) fluoranthene         ND         4.1         ng/L           2,3-Benzofuran         ND         5.4         ng/L           Benzo (ghi) perylene         ND         6.2         ng/L           Benzo (a) pyrene         ND         2.5         ng/L           Benzo (b) thiophene         2.6 J         5.2         ng/L           Benzo (b) thiophene         2.6 J         5.6         ng/L           Carbacole         ND         5.6         ng/L           Dibenzo (a) hathracene         ND         5.7         ng/L
Benzo(k) fluoranthene         ND         4.1         ng/L           2,3-Benzofuran         ND         5.4         ng/L           Benzo(ghi) perylene         ND         6.2         ng/L           Benzo(a) pyrene         ND         2.5         ng/L           Benzo(b) pyrene         ND         4.3         ng/L           Benzo(b) thiophene         2.6 J         5.2         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         3.8         ng/L           Dibenzole         ND         5.6         ng/L           Dibenzola         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluorene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         5.4         ng
2,3-Benzofuran       ND       5.4       ng/L         Benzo(ghi)perylene       ND       6.2       ng/L         Benzo(a)pyrene       ND       2.5       ng/L         Benzo(b) pyrene       ND       4.3       ng/L         Benzo(b) thiophene       2.6 J       5.2       ng/L         Biphenyl       ND       5.6       ng/L         Carbazole       ND       3.8       ng/L         Chrysene       ND       5.6       ng/L         Dibenzo(a,h) anthracene       ND       5.6       ng/L         Dibenzofuran       ND       5.7       ng/L         Dibenzothiophene       2.1 J       4.1       ng/L         2,3-Dihydroindene       61       5.0       ng/L         Fluorene       ND       4.6       ng/L         Fluorene       8.4       4.1       ng/L         Fluorene       8.4       4.1       ng/L         Indene       ND       4.7       ng/L         Indene       ND       5.4       ng/L         Indole       ND       5.4       ng/L         Indene       ND       5.9       ng/L         Indene       ND <td< td=""></td<>
Benzo (ghi) perylene         ND         6.2         ng/L           Benzo (a) pyrene         ND         2.5         ng/L           Benzo (b) pyrene         ND         4.3         ng/L           Benzo (b) thiophene         2.6 J         5.2         ng/L           Biphenyl         ND         5.6         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzole, h) anthracene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzo (a, h) anthracene         ND         5.7         ng/L </td
Benzo (a) pyrene         ND         2.5         ng/L           Benzo (e) pyrene         ND         4.3         ng/L           Benzo (b) thiophene         2.6 J         5.2         ng/L           Biphenyl         ND         5.6         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzo furan         ND         5.7         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indene         ND         5.4         ng/L           Indene         ND         5.4         ng/L           Indene         ND         5.6         ng/L           Indene         ND         5.6         ng/L           Indene<
Benzo (e) pyrene         ND         4.3         ng/L           Benzo (b) thiophene         2.6 J         5.2         ng/L           Biphenyl         ND         5.6         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzol (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indene         ND         5.4         ng/L           Indole         ND         5.4         ng/L           Indole         ND         5.9         ng/L           I-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         3.3         ng/L           Perylene         ND         6.3         ng/L           Phe
Benzo (b) thiophene         2.6 J         5.2         ng/L           Biphenyl         ND         5.6         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indene (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Naphthalene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L
Biphenyl         ND         5.6         ng/L           Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indene (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           Naphthalene         ND         8.6         ng/L           Naphthalene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Carbazole         ND         3.8         ng/L           Chrysene         ND         5.6         ng/L           Dibenzo (a,h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           Naphthalene         ND         5.6         ng/L           Naphthalene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Chrysene         ND         5.6         ng/L           Dibenzo (a,h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         5.4         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           Naphthalene         ND         5.6         ng/L           Naphthalene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Dibenzo (a, h) anthracene         ND         5.9         ng/L           Dibenzofuran         ND         5.7         ng/L           Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           Naphthalene         ND         5.6         ng/L           Naphthalene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Dibenzothiophene         2.1 J         4.1         ng/L           2,3-Dihydroindene         61         5.0         ng/L           Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Dibenzothiophene         2.1 J         4.1 ng/L           2,3-Dihydroindene         61         5.0 ng/L           Fluoranthene         ND         4.6 ng/L           Fluorene         8.4 4.1 ng/L           Indene         ND         4.7 ng/L           Indeno (1,2,3-cd) pyrene         ND         5.4 ng/L           Indole         ND         4.7 ng/L           2-Methylnaphthalene         ND         5.9 ng/L           1-Methylnaphthalene         ND         5.6 ng/L           Naphthalene         ND         8.6 ng/L           Perylene         ND         3.3 ng/L           Phenanthrene         ND         6.3 ng/L           Pyrene         ND         4.2 ng/L
2,3-Dihydroindene       61       5.0       ng/L         Fluoranthene       ND       4.6       ng/L         Fluorene       8.4       4.1       ng/L         Indene       ND       4.7       ng/L         Indeno (1,2,3-cd) pyrene       ND       5.4       ng/L         Indole       ND       4.7       ng/L         2-Methylnaphthalene       ND       5.9       ng/L         1-Methylnaphthalene       ND       5.6       ng/L         Naphthalene       ND       8.6       ng/L         Perylene       ND       3.3       ng/L         Phenanthrene       ND       6.3       ng/L         Pyrene       ND       4.2       ng/L
Fluoranthene         ND         4.6         ng/L           Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno(1,2,3-cd)pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Fluorene         8.4         4.1         ng/L           Indene         ND         4.7         ng/L           Indeno(1,2,3-cd)pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Indene         ND         4.7         ng/L           Indeno(1,2,3-cd)pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Indeno(1,2,3-cd)pyrene         ND         5.4         ng/L           Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Indole         ND         4.7         ng/L           2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
2-Methylnaphthalene         ND         5.9         ng/L           1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
1-Methylnaphthalene         ND         5.6         ng/L           Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Naphthalene         ND         8.6         ng/L           Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Perylene         ND         3.3         ng/L           Phenanthrene         ND         6.3         ng/L           Pyrene         ND         4.2         ng/L
Phenanthrene ND 6.3 ng/L Pyrene ND 4.2 ng/L
Pyrene ND 4.2 ng/L
_ ·
Quinoline ND 9.0 ng/L
PERCENT RECOVERY
SURROGATE RECOVERY LIMITS
Chrysene-d12 26 * (30 - 118)
Fluorene d-10 59 (41 - 162)
Naphthalene-d8 55 (30 - 108)

#### NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

## QC DATA ASSOCIATION SUMMARY

#### D3E280223

## Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3153163	3153051
002	WG	SW846 8270C SIM		3153163	3153051
003	WG	SW846 8270C SIM		3153163	3153051
004	WG	SW846 8270C SIM		3153163	3153051
005	WG	SW846 8270C SIM		3153163	3153051
006	WG	SW846 8270C SIM		3153163	3153051

#### METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E280223 Work Order #...: FPQKC1AA Matrix.....: WATER

MB Lot-Sample #: D3F020000-163

Analysis Date..: 06/24/03 Prep Batch #...: 3153163

Dilution Factor: 1

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo (a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo (a) pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
'hrysene	ND	5.6	ng/L	SW846 8270C SIM
Jibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno (1,2,3-cd) pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del>.</del>	
Chrysene-d12	59	(30 - 118	•	
Fluorene d-10	47	(41 - 162	-	
Naphthalene-d8	63	(30 - 108	}	

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E280223 Work Order #...: FPQKC1AC Matrix.....: WATER

LCS Lot-Sample#: D3F020000-163

 Prep Date....: 06/02/03
 Analysis Date..: 06/24/03

 Prep Batch #...: 3153163
 Analysis Time..: 20:44

Dilution Factor: 1

Dilucion Factor: 1			
	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	61	(30 - 150)	SW846 8270C SIM
Chrysene	5 <b>6</b>	(30 - 132)	SW846 8270C SIM
Fluorene	57	(30 - 132)	SW846 8270C SIM
Indene	55	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	57	(30 - 150)	SW846 8270C SIM
Naphthalene	63	(30 - 150)	SW846 8270C SIM
Quinoline	55	(30 - 150)	SW846 8270C SIM
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		60	(30 - 118)
Fluorene d-10		47	(41 - 162)
Naphthalene-d8		57	(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E280223 Work Order #...: FPQKC1AC Matrix.....: WATER

LCS Lot-Sample#: D3F020000-163

Prep Date....: 06/02/03 Analysis Date..: 06/24/03 Prep Batch #...: 3153163 Analysis Time..: 20:44

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	10.0	6.14	ng/L	61	SW846 8270C S
Chrysene	10.0	5.58	ng/L	56	SW846 8270C S
Fluorene	10.0	5.71	ng/L	57	SW846 8270C S
Indene	10.0	5.55	ng/L	55	SW846 8270C S
2-Methylnaphthalene	10.0	5.70	ng/L	57	SW846 8270C S
Naphthalene	10.0	6.35	ng/L	63	SW846 8270C S
Quinoline	10.0	5.46	ng/L	55	SW846 8270C S
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS		
Chrysene-d12	-	60	(30 - 11	8)	

SURROGATE	RECOVERY	LIMITS
Chrysene-d12	60	(30 - 118)
Fluorene d-10	47	(41 - 162)
Naphthalene-d8	57	(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #: D3E280223	Work Order #: FPHHV1AC-MS	Matrix: WG
-------------------------	---------------------------	------------

MS Lot-Sample #: D3E280223-001 FPHHV1AD-MSD

 Date Sampled...:
 05/27/03
 Date Received..:
 05/28/03

 Prep Date.....:
 06/02/03
 Analysis Date..:
 06/24/03

 Prep Batch #...:
 3153163
 Analysis Time..:
 21:59

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	0.0 a	(30 - 150)			SW846 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
Chrysene	32	(30 - 132)			SW846 8270C SIM
	30	(30 - 132)	20	(0-50)	SW846 8270C SIM
Fluorene	55	(30 - 132)			SW846 8270C SIM
	65	(30 - 132)	4.0	(0-50)	SW846 8270C SIM
Indene	53	(30 - 150)			SW846 8270C SIM
	67	(30 - 150)	11	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	56	(30 - 150)			SW846 8270C SIM
	70	(30 - 150)	9.9	(0-50)	SW846 8270C SIM
Naphthalene	67	(30 - 150)			SW846 8270C SIM
	89	(30 - 150)	16	(0-50)	SW846 8270C SIM
Quinoline	28 a	(30 - 150)			SW846 8270C SIM
	0.0 a,p	(30 - 150)	200	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		32		(30 - 118	3)
		29 *		(30 - 118	3)
Fluorene d-10		43		(41 - 162	2)
		50		(41 - 162	2)
Naphthalene-d8		56		(30 - 108	3)
		69		(30 - 108	3)

#### NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

<sup>•</sup> Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3E280223 Work Order #...: FPHHV1AC-MS Matrix.....: WG

MS Lot-Sample #: D3E280223-001 FPHHV1AD-MSD

 Date Sampled...:
 05/27/03
 Date Received..:
 05/28/03

 Prep Date.....:
 06/02/03
 Analysis Date..:
 06/24/03

Prep Batch #...: 3153163 Analysis Time..: 21:59

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	10.7	0.0	ng/L	0.0 a		SW846 8270C SIM
	ND	9.55	0.0	ng/L	0.0 a	0.0	SW846 8270C SIM
Chrysene	ND	10.7	3.48	ng/L	32		SW846 8270C SIM
	ND	9.55	2.85	ng/L	30	20	SW846 8270C SIM
Fluorene	ND	10.7	5.92	ng/L	55		SW846 8270C SIM
	ND	9.55	6.16	ng/L	65	4.0	SW846 8270C SIM
Indene	ND	10.7	5.74	ng/L	53		SW846 8270C SIM
	ND	9.55	6.40	ng/L	67	11	SW846 8270C SIM
2-Methylnaphthalene	ND	10.7	6.05	ng/L	56		SW846 8270C SIM
	ND	9.55	6.68	ng/L	70	9.9	SW846 8270C SIM
Naphthalene	ND	10.7	7.22	ng/L	67		SW846 8270C SIM
	ND	9.55	8.46	ng/L	89	16	SW846 8270C SIM
Quinoline	ND	10.7		ng/L	28 a		SW846 8270C SIM
	ND	9.55	0.0	ng/L	0.0	200	SW846 8270C SIM
	Qua	lifiers:	a,p				

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	32	(30 - 118)
	29 *	(30 - 118)
Fluorene d-10	43	(41 - 162)
	50	(41 - 162)
Naphthalene-d8	56	(30 - 108)
	69	(30 - 108)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

- Surrogate recovery is outside stated control limits.
- a Spiked analyte recovery is outside stated control limits.
- p Relative percent difference (RPD) is outside stated control limits.

## Chain of Custody Record

17,416,419,412 18 5/08/03



## Severn Trent Laboratories, Inc.

STL-4124 (0901)																								
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#### **DATA QUALITY ASSESSMENT**

STL Project # D3E280223 (L)

July 2, 2003

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of six aqueous samples for parts per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on May 27, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3E280223.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

GAC-SLP4T-052703 GAC-SLP4TD-052703 GAC-SLP4TFB-052703 GAC-SLP4TFBD-052703 GAC-SLP10T-052703 PCJ-SLP6-052703

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

#### Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory ranged from 4.2°C to 4.9°C. The cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

The method blank for this data package was batch 3153163. Target analytes were not detected in the laboratory method blank. In addition to the method blanks, a field blank and field blank duplicate were also submitted with this data set. Samples GAC-SLP4TFB-052703 and GAC-SLP4TFBD-052703 did not have any of the target analytes detected.

#### **Surrogate Spike Recoveries**

The percent recoveries of the chrysene-d12 surrogates were outside the QC acceptance criteria in three sample analyses. GAC-SLP4TD-052703, GAC-SLP10T-052703, and PCJ-SLP6-052703 had recoveries of 22%, 25%, and 26% respectively for chrysene-d12. They were outside the range of 30-118. The other surrogates were in control for all samples.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed for this data set. Sample D3E280223-001 had all percent recoveries and relative percent differences (RPDs) within the acceptable range except for the compounds benzo(e)pyrene and quinoline. The percent recoveries for benzo(e)pyrene was 0% and 0% for the MS/MSD and fell outside the range of 30-150. Quinoline had a 28% and 0% recovery for the MS/MSD. The RPDs for these compounds did not apply due to the 0% recovery. All other compounds had percent recoveries and RPDs within an acceptable range. The surrogate chrysene-d12 has a low recovery in the MSD sample at 29%.



Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	0/0	NA	30-150/0-50
Quinoline	28/0	NA	30-150/0-50

#### **Field Duplicate Results**

A duplicate sample was submitted for SLP4T-052703 with this data set. No target analytes were detected in the samples.

#### **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.



#### ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3F030220

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

**STL DENVER** 

Brian Stringer Project Manager

July 2, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
Table of Contents	
Case Narrative	
Executive Summary – Detection Highlights	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
Chain-of-Custody	
Chain-or-Custody	Check below when
Supporting Documentation	supporting
(Note: A one-page "Description of Supporting Documentation" is	documentation is
provided at the beginning of this section.).	present.
Volatile GC/MS	
. G L L CODEG	
Semivolatile GC/MS	
Volatile GC	
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• Semivolatile GC	
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• LC/MS or HPLC	
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Subcontracted Data	
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### CASE NARRATIVE D3F030220

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

#### Sample Receiving

Six samples were received under chain of custody on June 3, 2003. The samples were received in good condition at temperatures of 2.7°C, 2.4°C, 5.3°C, and 5.1°C.

Two of the six bottles for sample W410-060203 and four of the six bottles for sample W410D-060203 were received broken. There was sufficient volume remaining to perform the required 4-liter analysis for sample W410-060203. The client was contacted and requested that two sample bottles designated for MS/MSD for this sample be used to perform the required 4-liter analysis for sample W410D-060203.

#### GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Sample D3F030220-003 demonstrated recoveries of the surrogates chrysene-d12 and fluorene d-10 below control limits at 15% and 39%, respectively. The third surrogate is in control. This may indicate a low bias in the sample data; however no sample volume remains for reanalysis and no further corrective action was taken.

Samples D3F030220-001, 002, and 006 were analyzed undiluted and then at a dilution due to high concentrations of target analytes in the samples. Analytes whose concentrations did not exceed the calibration range are reported from the undiluted analyses, while those compounds that required dilution are only reported from the diluted analyses. Fluorene and indene are reported in the undiluted analyses of sample 001 as "E" flagged to provide parent sample data in order to calculate recoveries for the MS/MSD performed on this sample. Surrogate recoveries were not reported for the dilutions.

The MS/MSD performed on sample D3F030220-001 demonstrated recoveries that were below control limits for benzo(e)pyrene and indene. The sample concentration was greater than four times the spike level for benzo(e)pyrene.

No other anomalies were observed.

## Data Completeness for Method 8270C SIM

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLET	ENESS CALC	ULATION					
LOT:	D3F030220						
ANALYSIS:	5: SW846-8270C SIM						
QC Parameter	Data	Valid Data					
	Planned	Obtained					
Method Blank	31	31					
MB Surrogates	3	3					
LCS	7	7					
LCS Surrogates	3	3					
MS	7	5					
MS Surrogates	3	3					
MSD	7	. 6					
MSD Surrogates	3	3					
MS/MSD RPD	7	7					
FB/FBD	62	62					
Sample/Dup. RPD	31	31					
Sample Surrogates	18	16					
Samples and QC	30	30					
Internal Standard Area							
TOTAL	212	207					
% Completeness	97.6%						

<sup>\*</sup>A MS/MSD was performed on sample W410-060203

## Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD	<u> </u>	<del></del>	<u> </u>		
LOT D3F030220			<del></del>		
Sample: W410-060203		DUP: W410D-060203	<del>                                     </del>	·   · · · · · · · · · · · · · · · · · ·	
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	340	Acenaphthene	330	3.0	
Acenaphthylene	91	Acenaphthylene	84	8.0	
Acridine	8.2	Acridine	7.2	13.0	
Anthracene	16	Anthracene	15	6.5	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0	
2,3-Benzofuran	9.2	2,3-Benzofuran	ND	NC	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0	
Benzo(e)pyrene	ND	Benzo(e)ругепе	ND	0	
Benzo(b)thiophene	470	Benzo(b)thiophene	450	4.3	
Biphenyl	110	Biphenyl	100	9.5	
Carbazole	160	Carbazole	150	6.5	
Chrysene	ND	Chrysene	ND	0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0	
Dibenzofuran	140	Dibenzofuran	140	0.0	
Dibenzothiophene	13	Dibenzothiophene	12	8.0	
2,3-Dihydroindene	1200	2,3-Dihydroindene	1100	8.7	
Fluoranthene	9.7	Fluoranthene	8.4	14.4	
Fluorene	160	Fluorene	140	13.3	
Indene	960	Indene	900	6.5	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0	
Indole	ND	indole	ND	0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0	
1-Methylnaphthalene	540	1-Methylnaphthalene	510	5.7	
Naphthalene	52	Naphthalene	46	12.2	
Perylene	ND	Perylene	ND	0	
Phenanthrene	160	Phenanthrene	ND	0	
Pyrene	5.1	Pyrene	4.6	10.3	
Quinoline	8.4	Quinoline	7.7	8.7	

RPD = Relative Percent Difference
ND = Compound not detected in the sample
p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3F030220

		REPORTIN	<b>G</b>	ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
W410-060203 06/02/03 12:00 001				
Acenaphthene	340	140	ng/L	SW846 8270C SIM
Acenaphthylene	91	4.8	ng/L	SW846 8270C SIM
Acridine	8.2	6.2	ng/L	SW846 8270C SIM
Anthracene	16	4.2	ng/L	SW846 8270C SIM
2,3-Benzofuran	9.2	5.4	ng/L	SW846 8270C SIM
Benzo(b)thiophene	470	130	ng/L	SW846 8270C SIM
Biphenyl	110	5.6	ng/L	SW846 8270C SIM
Carbazole	160	95	ng/L	SW846 8270C SIM
Dibenzofuran	140	140	ng/L	SW846 8270C SIM
Dibenzothiophene	13	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	1200	120	ng/L	SW846 8270C SIM
Fluoranthene	9.7	4.6	ng/L	SW846 8270C SIM
Fluorene	160 E	4.1	ng/L	SW846 8270C SIM
Fluorene	160	100	ng/L	SW846 8270C SIM
Indene	1100 E	4.7	ng/L	SW846 8270C SIM
Indene	960	120	ng/L	SW846 8270C SIM
1-Methylnaphthalene	540	140	ng/L	SW846 8270C SIM
Naphthalene	52	8.6	ng/L	SW846 8270C SIM
Phenanthrene	160	160	ng/L	SW846 8270C SIM
Pyrene	5.1	4.2	ng/L	SW846 8270C SIM
Quinoline	8.4 J	9.0	ng/L	SW846 8270C SIM
W410D-060203 06/02/03 12:10 002				
Acenaphthene	330	140	ng/L	SW846 8270C SIM
Acenaphthylene	84	4.8	ng/L	SW846 8270C SIM
Acridine	7.2	6.2	ng/L	SW846 8270C SIM
Anthracene	15	4.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	450	130	ng/L	SW846 8270C SIM
Biphenyl	100	5. <b>6</b>	ng/L	SW846 B270C SIM
Carbazole	150	95	ng/L	SW846 8270C SIM
Dibenzofuran	140	140	ng/L	SW846 8270C SIM
Dibenzothiophene	12	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	1100	120	ng/L	SW846 8270C SIM
Fluoranthene	8.4	4.6	ng/L	SW846 8270C SIM
Fluorene	140	100	ng/L	SW846 8270C SIM
Indene	900	120	ng/L	SW846 8270C SIM
1-Methylnaphthalene	510	140	ng/L	SW846 8270C SIM
Naphthalene	46	8.6	ng/L	SW846 8270C SIM
Pyrene	4.6	4.2	ng/L	SW846 8270C SIM
Quinoline	7.7 J	9.0	ng/L	SW846 8270C SIM

(Continued on next page)

## **EXECUTIVE SUMMARY - Detection Highlights**

#### D3F030220

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W33-060203 06/02/03 11:45 003				
Acenaphthene	11	5.7	ng/L	SW846 8270C SIM
Acridine	2.4 J	6.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	16	4.3	ng/L	SW846 8270C SIM
Benzo (e) pyrene	1.1 J	4.3	ng/L	SW846 8270C SIM
Benzo (b) thiophene	13	5.2	ng/L	SW846 8270C SIM
Carbazole	11	3.8	ng/L	SW846 8270C SIM
Chrysene	50	5.6	ng/L	SW846 8270C SIM
2,3-Dihydroindene	39	5.0	ng/L	SW846 8270C SIM
Fluorene	2.4 J	4.1	ng/L	SW846 8270C SIM
Indene	6.3	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	4.1 J	5.9	ng/L	SW846 8270C SIM
Naphthalene	8.0 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	12	6.3	ng/L	SW846 8270C SIM
Pyrene	4.4	4.2	ng/L	SW846 8270C SIM
W24-060203 06/02/03 15:00 006				
Acenaphthene	21	5.7	ng/L	SW846 8270C SIM
Acridine	4.0 J	6.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	4.0 J	5.2	ng/L	SW846 8270C SIM
Dibenzofuran	8.3	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	6.1	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	280	20	ng/L	SW846 8270C SIM
Indene	8.0	4.7	ng/L	SW846 8270C SIM
Pyrene	4.0 J	4.2	ng/L	SW846 8270C SIM

## **METHODS SUMMARY**

#### D3F030220

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

Base/Neutrals and Acids SW846 8270C SIM SW846 3520C

References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

# D3F030220

ANALYTIC METHOD	AL	ANALYST	ANALYST ID
SW846 82	70C SIM	Tim O'Donnell	000443
Referenc	es:		
SW846		for Evaluating Solid Waste, Phy rd Edition, November 1986 and it	

# **SAMPLE SUMMARY**

#### D3F030220

<u>WO #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FPT6H	001	W410-060203	06/02/03	12:00
FPT6M	002	W410D-060203	06/02/03	12:10
FPT6R	003	W33-060203	06/02/03	11:45
FPT6V	004	W33FB-060203	06/02/03	11:20
FPT6X	005	W33FBD-060203	06/02/03	11:25
FPT62	006	W24-060203	06/02/03	15:00
NY/1012 / (	e) .			

#### NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, Ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

## Client Sample ID: W410-060203

## GC/MS Semivolatiles

Lot-Sample #: D3F030220-001 Date Sampled: 06/02/03 Prep Date: 06/07/03 Prep Batch #: 3158136 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	06/03/03 06/25/03	Matrix: WG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	91	4.8	ng/L
Acridine	8.2	6.2	ng/L
Anthracene	16	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	9.2	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Biphenyl	110	5.6	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
)ibenzothiophene	13	4.1	ng/L
Fluoranthene	9.7	4.6	ng/L
Fluorene	160 B	4.1	ng/L
Indene	1100 E	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
Naphthalene	52	8.6	ng/L
Perylene	ND	3.3	ng/L
Pyrene	5.1	4.2	ng/L
Quinoline	8.4 J	9.0	ng/L
	PERCENT	RECOVERY	

	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	43	(30 - 118)		
Fluorene d-10	50	(41 - 162)		
Naphthalene-d8	63	(30 - 108)		

# NOTE (S):

E  $\;$  Estimated result. Result concentration exceeds the calibration range.

J Estimated result. Result is less than RL.

# Client Sample ID: W410-060203

# GC/MS Semivolatiles

Lot-Sample #: D3F030220-001 Date Sampled: 06/02/03 Prep Date: 06/07/03 Prep Batch #: 3158136 Dilution Factor: 25	Work Order #: Date Received: Analysis Date: Analysis Time:	06/03/03 06/25/03	Matrix: WG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	340	140	ng/L
Benzo (b) thiophene	470	130	ng/L
Carbazole	160	95	ng/L
Dibenzofuran	140	140	ng/L
2,3-Dihydroindene	1200	120	ng/L
Fluorene	160	100	ng/L
Indene	960	120	ng/L
1-Methylnaphthalene	540	140	ng/L
Phenanthrene	160	160	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 118)	•
Fluorene d-10	NC, DIL	(41 - 162)	
Naphthalene-d8	NC, DIL	(30 - 108)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W410D-060203

## GC/MS Semivolatiles

Lot-Sample #: D3F030220-002 Date Sampled: 06/02/03 Prep Date: 06/07/03 Prep Batch #: 3158136 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method	06/03/03 06/25/03 18:40	Matrix WG
	ractated	DNOTO 0270	
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	84	4.8	ng/L
Acridine	7.2	6.2	ng/L
Anthracene	1.5	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Biphenyl	100	5.6	ng/L
Chrysene	ND	5.6	ng/L

5.9

4.1

4.6

5.4

(41 - 162)

(30 - 108)

ng/L

ng/L

ng/L

ng/L

		5,	_
Indole	ND	4.7 ng/	L
2-Methylnaphthalene	ND	5.9 ng/	L
Naphthalene	46	8.6 ng/	L
Perylene	ND	3.3 ng/	L
Pyrene	4.6	4.2 ng/	L
Quinoline	7.7 J	9.0 ng/	L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	30	(30 - 118)	

50

62

ND

12

8.4

ND

NOTE (S):

Fluorene d-10

Naphthalene-d8

Dibenzo(a,h)anthracene

Indeno(1,2,3-cd)pyrene

ibenzothiophene

**Pluoranthene** 

J Estimated result. Result is less than RL.

# Client Sample ID: W410D-060203

# GC/MS Semivolatiles

Lot-Sample #: D3F030220-002	Work Order #:	FPT6M2AA	<b>Matrix</b> : WG
Date Sampled: 06/02/03	Date Received:	06/03/03	
Prep Date: 06/07/03	Analysis Date:	06/25/03	
Prep Batch #: 3158136	Analysis Time:	18:04	
Dilution Factor: 25			
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	330	140	ng/L
Benzo (b) thiophene	450	130	ng/L
Carbazole	150	95	ng/L
Dibenzofuran	140	140	ng/L
2,3-Dihydroindene	1100	120	ng/L
Fluorene	140	100	ng/L
Indene	900	120	ng/L
1-Methylnaphthalene	510	140	ng/L
Phenanthrene	ND	160	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 118)	
Fluorene d-10	NC, DIL	(41 - 162)	
Naphthalene-d8	NC, DIL	(30 - 108)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W33-060203

# GC/MS Semivolatiles

Lot-Sample #: D3F030220-003	Work Order #:	FPT6R1AA	Matrix WG
Date Sampled: 06/02/03	Date Received:	06/03/03	
Prep Date: 06/07/03	Analysis Date:		
Prep Batch #: 3158136	Analysis Time:		
Dilution Factor: 1	•		
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	11	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	2.4 J	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	16	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	1.1 J	4.3	ng/L
Benzo (b) thiophene	13	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	11	3.8	ng/L
Chrysene	50	5.6	ng/L
Dibenzo(a,h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	39	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	2.4 J	4.1	ng/L
Indene	6.3	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	4.1 J	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	B.O J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	12	6.3	ng/L
Pyrene	4.4	4.2	ng/L
Quinoline	ND	9.0	ng/L

	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	15 *	(30 - 118)	
Fluorene d-10	39 *	(41 - 162)	
Naphthalene-d8	43	(30 - 108)	

# NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

Estimated result. Result is less than RL.

# Client Sample ID: W33FB-060203

# GC/MS Semivolatiles

Lot-Sample #: D3F030220-004	Work Order #: FPT6V1AA	Matrix WG
Date Sampled: 06/02/03	Date Received: 06/03/03	

**Prep Date....:** 06/07/03 Analysis Date..: 06/25/03 Prep Batch #...: 3158136 Analysis Time..: 15:43

Dilution Factor: 1

Method....: SW846 8270C SIM

PARAMETER	RESULT	REPORTIN	
Acenaphthene	ND KESULI	<u>LIMIT</u> 5.7	
Acenaphthylene	ND	4.8	
cridine	ND	6.2	ng/L
nthracene			ng/L
denzo(a)anthracene	ND	4.2	ng/L
• •	ND	4.3	ng/L
Senzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo (ghi) perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Siphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
luoranthene	ND	4.6	ng/L
'luorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
-Methylnaphthalene	ND	5.6	ng/L
aphthalene	ND	8.6	ng/L
erylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
hrysene-d12	72	(30 - 11	<del>B)</del>
luorene d-10	54	(41 - 16)	
Japhthalene-d8	63	(30 - 10)	- •

# Client Sample ID: W33FBD-060203

# GC/MS Semivolatiles

Lot-Sample #: D3F030220-005 We	Nork Order #: FPT6X1AA	Matrix: WG
--------------------------------	------------------------	------------

 Date Sampled...:
 06/02/03
 Date Received..:
 06/03/03

 Prep Date....:
 06/07/03
 Analysis Date..:
 06/25/03

 Prep Batch #...:
 3158136
 Analysis Time..:
 16:18

Dilution Factor: 1

Method.....: SW846 8270C SIM

	Method	: SW846 B270	OC SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND.	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b)fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
'arbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
l-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	69	(30 - 118)	_
Fluorene d-10	46	·	
		(41 - 162)	
Naphthalene-d8	57	(30 - 108)	

## Client Sample ID: W24-060203

#### GC/MS Semivolatiles

Method..... SW846 8270C SIM

Lot-Sample #: D3F030220-006	Work Order #: FPT621AA	Matrix WG
Date Sampled: 06/02/03	Date Received: 06/03/03	
Prep Date: 06/07/03	Analysis Date: 06/25/03	
Prep Batch #: 3158136	Analysis Time: 16:54	
Dilution Factor: 1		

REPORTING LIMIT PARAMETER RESULT UNITS Acenaphthene 21 5.7 ng/L Acenaphthylene ND 4.8 ng/L Acridine 4.0 J 6.2 ng/L Anthracene ND 4.2 ng/L Benzo(a) anthracene ND 4.3 ng/L Benzo(b) fluoranthene ND 4.7 ng/L Benzo(k) fluoranthene ND 4.1 ng/L 2,3-Benzofuran ND ng/L 5.4 Benzo (ghi) perylene ND 6.2 ng/L Benzo (a) pyrene ND 2.5 ng/L Benzo (e) pyrene ND 4.3 ng/L Benzo (b) thiophene 4.0 J 5.2 ng/L Biphenyl ND 5.6 ng/L Carbazole ND 3.8 ng/L Chrysene ND 5.6 ng/L Dibenzo (a, h) anthracene ND 5.9 nq/L Dibenzofuran 8.3 5.7 ng/L Dibenzothiophene 6.1 4.1 ng/L Fluoranthene ND 4.6 ng/L Fluorene ND 4.1 ng/L Indene 8.0 4.7 ng/L Indeno (1, 2, 3-cd) pyrene ND 5.4 ng/L Indole ND 4.7 ng/L 2-Methylnaphthalene ND 5.9 ng/L 1-Methylnaphthalene ND 5.6 ng/L Naphthalene ND 8.6 ng/L Perylene ND 3.3 ng/L Phenanthrene ND 6.3 ng/L Pyrene 4.0 J 4.2 ng/L Quinoline ND 9.0 ng/L

PERCENT	RECOVERY		
RECOVERY	LIMITS		
37	(30 - 118)		
64	(41 - 162)		
63	(30 - 108)		
	RECOVERY 37 64		

#### NOTE(S):

J Estimated result. Result is less than RL.

# Client Sample ID: W24-060203

# GC/MS Semivolatiles

Lot-Sample #: D3F030220-006 Date Sampled: 06/02/03 Prep Date: 06/07/03 Prep Batch #: 3158136 Dilution Factor: 4	Work Order #: Date Received: Analysis Date: Analysis Time:	06/03/03 06/25/03	Matrix: WG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
2,3-Dihydroindene	280	20	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 118)	
Fluorene d-10	NC, DIL	(41 - 162)	
Naphthalene-d8	NC, DIL	(30 - 108)	
NOTE (S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# QC DATA ASSOCIATION SUMMARY

# D3F030220

# Sample Preparation and Analysis Control Numbers

Sample#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3158136	3158023
002	WG	SW846 8270C SIM		3158136	3158023
003	WG	SW846 8270C SIM		3158136	3158023
004	WG	SW846 8270C SIM		3158136	3158023
005	WG	SW846 8270C SIM		3158136	3158023
006	₩G	SW846 8270C SIM		3158136	3158023

## METHOD BLANK REPORT

# GC/MS Semivolatiles

Client Lot #...: D3F030220

Work Order #...: FP6LW1AA

Matrix....: WATER

MB Lot-Sample #: D3F070000-136

Prep Date....: 06/07/03
Prep Batch #...: 3158136

Analysis Time..: 11:36

**Analysis Date..:** 06/25/03

Dilution Factor: 1

REPORTING

PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo (a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k)fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo (a) pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b)thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
hrysene	ND	5.6	ng/L	SW846 8270C SIM
Jibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	NID	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVER	Y	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	68	(30 - 13	18)	
Fluorene d-10	54	(41 - 16	52)	
Naphthalene-d8	65	(30 - 10	08)	

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

# GC/MS Semivolatiles

Client Lot #...: D3F030220 Work Order #...: FP6LW1AC Matrix.....: WATER

LCS Lot-Sample#: D3F070000-136

Prep Date....: 06/07/03 Analysis Date..: 06/25/03
Prep Batch #...: 3158136 Analysis Time..: 12:11

Dilution Factor: 1

47

56

(41 - 162)

(30 - 108)

NOTE(S):

Fluorene d-10

Naphthalene-d8

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3F030220 Work Order #...: FP6LW1AC Matrix.....: WATER

LCS Lot-Sample#: D3F070000-136

Prep Date....: 06/07/03 Analysis Date..: 06/25/03
Prep Batch #...: 3158136 Analysis Time..: 12:11

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	75.0	43.9	ng/L	58	SW846 8270C S
Chrysene	75.0	44.8	ng/L	60	SW846 8270C S
Fluorene	75.0	41.4	ng/L	55	SW846 8270C S
Indene	75.0	40.4	ng/L	54	SW846 8270C S
2-Methylnaphthalene	75.0	38.5	ng/L	51	SW846 8270C S
Naphthalene	75.0	41.5	ng/L	55	SW846 8270C S
Quinoline	75.0	42.0	ng/L	56	SW846 8270C S
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS	_	
Chrysene-d12		64	(30 - 118)		
Fluorene d-10		47	(41 - 162)		
Naphthalene-d8		56	(30 - 108)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3F030220 Work Order #...: FPT6H1AC-MS Matrix.....: WG

MS Lot-Sample #: D3F030220-001 FPT6H1AD-MSD

 Date Sampled...:
 06/02/03
 Date Received..:
 06/03/03

 Prep Date....:
 06/07/03
 Analysis Date..:
 06/25/03

 Prep Batch #...:
 3158136
 Analysis Time..:
 13:22

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	11 a	(30 - 150)			SW846 8270C SIM
	10 a	(30 - 150)	10	(0-50)	SW846 8270C SIM
Chrysene	38	(30 - 132)			SW846 8270C SIM
	36	(30 - 132)	11	(0-50)	SW846 8270C SIM
Fluorene	55	(30 - 132)			SW846 8270C SIM
	65	(30 - 132)	2.3	(0-50)	SW846 8270C SIM
Indene	11 a	(30 - 150)			SW846 8270C SIM
	100	(30 - 150)	5.4	(0~50)	SW846 8270C SIM
2-Methylnaphthalene	58	(30 - 150)			SW846 8270C SIM
	63	(30 - 150)	1.2	(0-50)	SW846 8270C SIM
Naphthalene	58	(30 - 150)			SW846 8270C SIM
	62	(30 - 150)	0.57	(0-50)	SW846 8270C SIM
Quinoline	66	(30 - 150)			SW846 8270C SIM
	70	(30 - 150)	0.27	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE	<del></del>	RECOVERY		LIMITS	_
Chrysene-d12		43		(30 - 118	3)
		41		(30 - 118	3)
Fluorene d-10		49		(41 - 162	2)
		51		(41 - 162	2)
Naphthalene-d8		61		(30 - 108	3)
		65		(30 - 108	3)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3F030220 Work Order #...: FPT6H1AC-MS Matrix..... WG

MS Lot-Sample #: D3F030220-001 FPT6H1AD-MSD

 Date Sampled...:
 06/02/03
 Date Received..:
 06/03/03

 Prep Date.....:
 06/07/03
 Analysis Date..:
 06/25/03

 Prep Batch #...:
 3158136
 Analysis Time..:
 13:22

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	76.0	8.01	ng/L	11 a		SW846 8270C SIM
	ND	71.9	7.24	ng/L	10 a	10	SW846 8270C SIM
Chrysene	ND	76.0	28.8	ng/L	38		SW846 8270C SIM
	ND	71.9	25.7	ng/L	36	11	SW846 8270C SIM
Fluorene	160	76.0	206	ng/L	55		SW846 8270C SIM
	160	71.9	210	ng/L	65	2.3	SW846 8270C SIM
Indene	1100	76.0	1150	ng/L	11 a		SW846 8270C SIM
	1100	71.9	1210	ng/L	100	5.4	SW846 8270C SIM
2-Methylnaphthalene	ND	76.0	44.4	ng/L	58		SW846 8270C SIM
•	ND	71.9	45.0	ng/L	63	1.2	SW846 8270C SIM
Naphthalene	52	76.0	96.0	ng/L	58		SW846 8270C SIM
	52	71.9	96.5	ng/L	62	0.57	SW846 8270C SIM
Quinoline	8.4	76.0	58.7	ng/L	66		SW846 8270C SIM
	8.4	71.9	58.9	ng/L	70	0.27	SW846 8270C SIM
				_			

PERCENT	RECOVERY
RECOVERY	LIMITS
43	(30 - 118)
41	(30 - 118)
49	(41 - 162)
51	(41 - 162)
61	(30 - 108)
65	(30 - 108)
	43 41 49 51

# NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record

NB 6/5/0 =



Services Severn Trent Laboratories, Inc.

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# Chair-of Custody Record

B 6/3/03



# Services Severn Trent Laboratories, Inc.

STL-4124 (0901)						
City of St. Louis Park		Project Mai	H And	terson	Date 6 2 0 3	Chain of Custody Number 150747
3752 Wooddale Ave		Telephone 952	Number (Area Cod	dc)/Fax Number	Lab Number	- / /
City State Zin	55416	Site Contact	61899	Lab Contact Brian Stringer	Analysis (Attach list if more space is needed)	Page of
Project Name and Location (State)	7 110		/bill Number	Milar Files	72	Sa soial tracta artisant
Contract/Purchase Order/Quote No.	_ <del></del>		Matrix	Containers & Preservatives	<i>lad</i>	Special Instructions/ Conditions of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time 3	Sed.	Unpress H2SO4 HW03 HCI NaOH NaOH	# <b>K</b>	
W33-060203		1145	X	6		PAH-PPT 75
W33FB - 060203		120				
W33 F8D-060203		1125				
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#### **DATA QUALITY ASSESSMENT**

STL Project # D3F030220 (M)

March 1, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of six aqueous samples for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on June 2, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3F030220.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W410-060203 W410D-060203 W33-060203 W33FB-060203 W34-060203

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

#### Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

## **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.4-5.3°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3158136. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses except for W33-060203. Chrysene-d12 and fluorene-d10 were below the control limits at 15 % and 39% respectively. The third surrogate is in control.

# **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### **MS/MSD Results**

MS/MSD analyses were performed on sample W410-060203. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recoveries for benzo(e)pyrene was 11% for the MS sample and 10% for the MSD sample. The MS sample had a recovery of only 11% for Indene. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	11/10	ok	30-150/0-50
Indene	11/ok	ok	30-150/0-50



## **Field Duplicate Results**

The sample W410-060203 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for all detected analytes. A total of 18 out of 31 compounds were detected with a RPD range of 0.0% to 14.4%.

# **Quantitation Limits and Sample Results**

There were three samples analyzed using a dilution. W410-060203 and W410D-060203 were diluted by a factor of 25 due to elevated concentrations of target analytes. Sample W24-060203 was diluted by a factor of 4 for the compound 2,3-Dihydroindene. All reporting limits were adjusted accordingly.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.



# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H050238

Mr. Scott Anderson

City of St. Louis Park **Utility Division** 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer

Project Manager

September 9, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
Table of Contents	
<ul> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> </ul>	
<ul> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> </ul>	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
<ul> <li>QC Data Association Summary</li> </ul>	
Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
• Subcontracted Data	

# CASE NARRATIVE D3H050238

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

# Sample Receiving

Eight samples were received under chain of custody on August 8, 2003. The samples were received in good condition at temperatures of 3.7°C and 2.7°C.

## GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3H050238-007 and 008 were analyzed undiluted and then at a dilution due to high concentrations of target analytes in the samples. Analytes whose concentrations did not exceed the calibration range are reported from the undiluted analyses, while those compounds that required dilution are only reported from the diluted analyses. Naphthalene is reported in the undiluted analyses of sample 007 as "E" flagged to provide parent sample data in order to calculate recoveries for the MS/MSD performed on this sample. Surrogate recoveries were not reported for the dilutions.

The MS/MSD performed on sample D3H050238-007 demonstrated recoveries that were above control limits for naphthalene. The MS demonstrated an additional recovery that was above the upper control limit for indene.

The MS/MSD associated with batch 3223209 was performed on a sample from another client and/or lot and was not in control.

No other anomalies were observed.

# Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETENESS CALCULATION						
LOT: D3H050238						
ANALYSIS: PAHs by SW846-8270C						
QC Parameter	Data Planned	Valid Data Obtained				
Method Blank	31	31				
MB Surrogates	3	3				
LCS	7	7				
LCS Surrogates	3	3				
FB/FBD	62	62				
MS	7	5				
MS Surrogates	3	3				
MSD	7	6				
MSD Surrogates	3	3				
MS/MSD RPD	7	7				
Sample/Dup. RPD	31	31				
Sample Surrogates	24	24				
Samples and QC Internal Standard Area	36	36				
TOTAL	224	221				
% Completeness	98.7%					

<sup>\*</sup>A MS/MSD was performed on sample W439-080403

# Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD	<del>                                      </del>				
LOT D3H050238				!	
Sample: W439-080403		DUP: W439D-080403			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	75	Acenaphthene	80	6.5	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	6.1	2,3-Benzofuran	6.8	10.9	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	66	Benzo(b)thiophene	73	10.1	
Biphenyl	9.3	Biphenyl	9.9	6.3	
Carbazole	17	Carbazole	17	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	14	Dibenzofuran	14	0.0	
Dibenzothiophene	2.0	Dibenzothiophene	2.9	36.7	
2,3-Dihydroindene	180	2,3-Dihydroindene	200	10.5	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	12	Fluorene	13	8.0	
Indene	88	Indene	98	10.8	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	26	2-Methylnaphthalene	29	10.9	
1-Methylnaphthalene	94	1-Methylnaphthalene	100	6.2	
Naphthalene	780	Naphthalene	840	7.4	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	9.6	Phenanthrene	10	4.1	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	1.5	Quinoline	1.7	12.5	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits

<sup>\*</sup>NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3H050238

		DEDODETN	a	A 1 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A
PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
t faction to the	RESORI		ONIIS	METHOD
P307-080403 08/04/03 08:50 001				
Acenaphthene	11	10	ug/L	SW846 8270C
Acenaphthylene	1.7 J	10	ug/L	SW846 8270C
Benzo (b) thiophene	5.5 J	10	ug/L	SW846 8270C
Carbazole	3.8 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	24	10	ug/L	SW846 8270C
Fluorene	2.4 J	10	ug/L	SW846 8270C
1-Methylnaphthalene	12	10	ug/L	SW846 8270C
P309-080403 08/04/03 12:15 003				
Acenaphthene	21	10	ug/L	SW846 8270C
Carbazole	7.3 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	11	10	ug/L	SW846 8270C
Naphthalene	3.8 J	10	ug/L	SW846 8270C
W439-080403 08/04/03 08:00 007				
Acenaphthene	75	10	ug/L	SW846 8270C
2,3-Benzofuran	6.1 J	10	ug/L	SW846 8270C
Benzo(b)thiophene	66	10	ug/L	SW846 8270C
Biphenyl	9.3 J	10	ug/L	SW846 8270C
Carbazole	17	10	ug/L	SW846 8270C
Dibenzofuran	14	10	ug/L	SW846 8270C
Dibenzothiophene	2.0 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	180	100	ug/L	SW846 8270C
Fluorene	12	10	ug/L	SW846 8270C
Indene	88	10	ug/L	SW846 8270C
2-Methylnaphthalene	26	10	ug/L	SW846 8270C
1-Methylnaphthalene	94	10	ug/L	SW846 8270C
Naphthalene	780	100	ug/L	SW846 8270C
Phenanthrene	9.6 J	10	ug/L	SW846 8270C
Quinoline	1.5 J	10	ug/L	SW846 8270C
W439D-080403 08/04/03 08:05 008				
Acenaphthene	80	10	ug/L	SW846 8270C
2,3-Benzofuran	6.8 J	10	ug/L	SW846 8270C
Benzo(b)thiophene	73	10	ug/L	SW846 8270C
Biphenyl	9.9 J	10	ug/L	SW846 8270C
Carbazole	17	10	ug/L	SW846 8270C
Dibenzofuran	14	10	ug/L	SW846 8270C
Dibenzothiophene	2.9 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	200	100	ug/L	SW846 8270C

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

# . D3H050238

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W439D-080403 08/04/03 08:05 008				
Fluorene	13	10	ug/L	SW846 8270C
Indene	98	10	ug/L	SW846 8270C
2-Methylnaphthalene	29	10	ug/L	SW846 8270C
1-Methylnaphthalene	100	10	ug/L	SW846 8270C
Naphthalene	B40	100	ug/L	SW846 8270C
Phenanthrene	10	10	ug/L	SW846 8270C
Quinoline	1.7 Ј	10	ug/L	SW846 8270C

# **METHODS SUMMARY**

# D3H050238

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

## D3H050238

ANALYTICAL		ANALYST
METHOD	ANALYST	
SW846 8270C	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

## D3H050238

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FVNAC	001	P307-080403	08/04/03	08:50
FVNAF	002	P112-080403	08/04/03	13:15
FVNAH	003	P309-080403	08/04/03	12:15
FVNAK	004	P308-080403	08/04/03	09:50
FVNAL	005	P308FB-080403	08/04/03	09:45
FVNAP	006	P308FBD-080403	08/04/03	09:45
FVNAQ	007	W439-080403	08/04/03	08:00
FVNAR	800	W439D-080403	08/04/03	08:05

#### NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: P307-080403

# GC/MS Semivolatiles

Lot-Sample #: D3H050238-001 Date Sampled: 08/04/03 Prep Date: 08/11/03	Work Order #: Date Received: Analysis Date:	08/05/03	Matrix: WG
Prep Batch #: 3223209 Dilution Factor: 1	Analysis Time:		
	Method:	SW846 8270	C
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	11	10	<del></del>
Acenaphthylene	1.7 J	10	ug/L ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo (b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo (b) thiophene	5.5 J	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	3.8 J	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	24	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	2.4 J	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	12	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
AV	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	80	(30 - 160)	
Fluorene d-10	81	(36 - 127)	
Naphthalene-d8	78	(37 - 107)	

# NOTE (S):

J Estimated result. Result is less than RL.

# Client Sample ID: P112-080403

# GC/MS Semivolatiles

Lot-Sample #: D3H050238-002	Work Order #: FVNAF1AA	Matrix WG
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 Date Sampled...:
 08/04/03
 Date Received...:
 08/05/03

 Prep Date.....:
 08/11/03
 Analysis Date...:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time...:
 12:13

Dilution Factor: 1
Method.....: SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L

	PERCENT	RECOVERY LIMITS	
SURROGATE	RECOVERY		
Chrysene-dl2	92	(30 - 160)	
Fluorene d-10	86	(36 - 127)	
Naphthalene-d8	76	(37 - 107)	

# Client Sample ID: P309-080403

# GC/MS Semivolatiles

Lot-Sample #: D3H050238-003	Work Order #:	FVNAH1AA	Matrix WG
Date Sampled: 08/04/03	Date Received:	08/05/03	
Prep Date: 08/11/03	Analysis Date:	09/03/03	
Prep Batch #: 3223209	Analysis Time:	12:50	
Dilution Factor: 1			
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	21	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo(e) pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	7.3 J	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	11	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	3.8 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	63	(30 - 160)	
Fluorene d-10	68	(36 - 127)	
Naphthalene-d8	62	(37 - 107)	

# NOTE(S):

I Estimated result. Result is less than RL.

#### Client Sample ID: P308-080403

#### GC/MS Semivolatiles

Lot-Sample #:	D3H050238-004	Work Order #: FVNAK1AA	Matrix WG

Date Sampled...: 08/04/03 Date Received..: 08/05/03 Prep Date....: 08/11/03 Analysis Date..: 09/03/03 Prep Batch #...: 3223209 Analysis Time..: 13:26

Dilution Factor: 1

Dilution Factor: 1	Method	: SW846 82	1270C	
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	
Acenaphthylene	ND	10	ug/L	
cridine	ND	10	ug/L	
nthracene	ND	10	ug/L	
enzo(a) anthracene	ND	10	ug/L	
enzo(b)fluoranthene	ND	10	ug/L	
enzo(k)fluoranthene	ND	10	ug/L	
3-Benzofuran	ND	10	ug/L	
enzo(ghi)perylene	ND	10	ug/L	
enzo(a) pyrene	ND	10	ug/L	
enzo(e)pyrene	ND	10	ug/L	
nzo(b)thiophene	ND	10	ug/L	
phenyl	ND	10	ug/L	
rbazole	ND	10	ug/L	
rysene	ND	10	ug/L	
oenzo (a,h) anthracene	ND	10	ug/L	
penzofuran	ND	10	ug/L	
benzothiophene	ND	10	ug/L	
3-Dihydroindene	ND	10	ug/L	
uoranthene	ND	10	ug/L	
uorene	ND	10	ug/L	
dene	ND	10	ug/L	
deno(1,2,3-cd)pyrene	ND	10	ug/L	
dole	ИD	10	ug/L	
Methylnaphthalene	ND	10	ug/L	
Methylnaphthalene	ND	10	ug/L	
phthalene	ND	10	ug/L	
rylene	ND	10	ug/L	
enanthrene	ND	10	ug/L	
rene	ND	10	ug/L	
inoline	ND	10	ug/L	
	PERCENT	RECOVERY		
JRROGATE	RECOVERY	LIMITS		
rysene-d12	55	(30 - 16	0)	
luorene d-10	68	(36 - 12	7)	
		: :		

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	55	(30 - 160)
Fluorene d-10	68	(36 - 127)
Naphthalene-d8	68	(37 - 107)

1

## Client Sample ID: P308FB-080403

#### GC/MS Semivolatiles

Lot-Sample #: D3H050238-005	Work Order #: FVNAL1AA	Matrix WG
Date Sampled: 08/04/03	Date Received: 08/05/03	
Prep Date: 08/11/03	Analysis Date: 09/03/03	
Prep Batch #: 3223209	Analysis Time: 14:04	
Dilution Factor: 1		

Method. ..: SW846 8270C

	Method: SW846 8270C			
		REPORTIN	IG	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo(a) anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b) thiophene	ND	10	ug/L	
Biphenyl	ND	10	ug/L	
Carbazole	ND	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
2,3-Dihydroindene	ND	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	ND	10	ug/L	
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	ND	10	ug/L	
1-Methylnaphthalene	ND	10	ug/L	
Naphthalene	ND	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY	•	
SURROGATE	RECOVERY	LIMITS	<del></del>	
Chrysene-d12	70	(30 - 16	0)	

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	70	(30 - 160)
Fluorene d-10	69	(36 - 127)
Naphthalene-d8	73	(37 - 107)

#### Client Sample ID: P308FBD-080403

#### GC/MS Semivolatiles

Lot-Sample #:	D3H050238-006	Work Order #: FVNAP1AA	Matrix: WG
Date Campled .	00/04/03	Date Persisad - 09/05/03	

Date Sampled...: 08/04/03 Date Received..: 08/05/03 **Prep Date....:** 08/11/03 **Analysis Date..:** 09/03/03 Prep Batch #...: 3223209 Analysis Time..: 14:41

Dilution Factor: 1

Dilution Factor: 1	Method	: SW846 82	SW846 8270C	
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
nthracene	ND	10	ug/L	
enzo(a) anthracene	ND	10	ug/L	
enzo(b)fluoranthene	ND	10	ug/L	
enzo(k) fluoranthene	ND	10	ug/L	
,3-Benzofuran	ND	10	ug/L	
enzo(ghi)perylene	ND	10	ug/L	
enzo (a) pyrene	ND	10	ug/L	
enzo(e)pyrene	ND	10	ug/L	
enzo(b)thiophene	ND	10	ug/L	
iphenyl	ND	10	ug/L	
arbazole	ЙD	10	ug/L	
nrysene	ND	10	ug/L	
benzo(a,h)anthracene	ND	10	ug/L	
benzofuran	ND	10	ug/L	
benzothiophene	ND	10	ug/L	
3-Dihydroindene	ND	10	ug/L	
uoranthene	ND	10	ug/L	
uorene	ND	10	ug/L	
dene	ND	10	ug/L	
deno(1,2,3-cd)pyrene	ND	10	ug/L	
dole	ND	10	ug/L	
-Methylnaphthalene	ND	10	ug/L	
Methylnaphthalene	ND	10	ug/L	
aphthalene	ND	10	ug/L	
erylene	ND	10	ug/L	
nenanthrene	ND	10	ug/L	
yrene	ND	10	ug/L	
inoline	ND	10	ug/L	
	PERCENT	RECOVERY		
URROGATE	RECOVERY	LIMITS		
rysene-d12	70	(30 - 16	0)	
uorene d-10	69	(36 - 127)		

PERCENT	RECOVERI
RECOVERY	LIMITS
70	(30 - 160)
69	(36 - 127)
65	(37 - 107)
	<u>RECOVERY</u> 70 69

#### Client Sample ID: W439-080403

Lot-Sample #: D3H050238-007 Date Sampled: 08/04/03 Prep Date: 08/11/03 Prep Batch #: 3223209 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/05/03 09/03/03 15:18	Matrix: WG
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	75	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	NID	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	6.1 J	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	66	10	ug/L
Biphenyl	9.3 J	10	ug/L
Carbazole	17	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	14	10	ug/L
Dibenzothiophene	2.0 J	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	12	10	ug/L
Indene	88	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	26	10	ug/L
1-Methylnaphthalene	94	10	ug/L
Naphthalene	880 K	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	9.6 J	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	1.5 J	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	43	(30 - 160)	
Fluorene d-10	59	(36 - 127)	
Naphthalene-d8	60	(37 - 107)	

NOTE(S):

J Estimated result. Result is less than RL.

E Estimated result. Result concentration exceeds the calibration range.

#### Client Sample ID: W439-080403

Lot-Sample #: D3H050238-007 Date Sampled: 08/04/03	Work Order #: Date Received:	<del>-</del> .	Matrix WG
Prep Date: 08/11/03	Analysis Date:	•	
Prep Batch #: 3223209	Analysis Time:		
Dilution Factor: 10	-		
	Method:	SW846 8270	С
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
2,3-Dihydroindene	180	100	ug/L
Naphthalene	780	100	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

## Client Sample ID: W439D-080403

Lot-Sample #: D3H050238-008	Work Order #:		Matrix WG	
Date Sampled: 08/04/03	Date Received:			
Prep Date: 08/11/03	Analysis Date:			
Prep Batch #: 3223209	Analysis Time:	17:08		
Dilution Factor: 1	Mothod .	CM046 9370	C	
	Method: SW846 8270C			
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	80	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo (a) anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	6.8 J	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo (a) pyrene	ND	10	ug/L	
Benzo(e) pyrene	ND	10	ug/L	
Benzo(b) thiophene	73	10	ug/L	
Biphenyl	9.9 J	10	ug/L	
Carbazole	17	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo (a, h) anthracene	ND	10	ug/L	
Dibenzofuran	14	10	ug/L	
Dibenzothiophene	2.9 J	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	13	10	ug/L	
Indene	98	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	29	10	ug/L	
1-Methylnaphthalene	100	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	10	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	1.7 J	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	56	(30 - 160)		
Fluorene d-10	62	(36 - 127)		
Naphthalene-d8	68	(37 - 107)		

J Estimated result. Result is less than RL.

#### Client Sample ID: W439D-080403

Lot-Sample #: D3H050238-008 Date Sampled: 08/04/03 Prep Date: 08/11/03 Prep Batch #: 3223209 Dilution Factor: 10	Work Order #: Date Received: Analysis Date: Analysis Time:	08/05/03 09/04/03	Matrix: WG
	Method:	SW846 8270	С
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
2,3-Dihydroindene	200	100	ug/L
Naphthalene	840	100	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# QC DATA ASSOCIATION SUMMARY

#### D3H050238

# Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3223209	3223083
002	WG	SW846 8270C		3223209	3223083
003	WG	SW846 8270C		3223209	3223083
004	WG	SW846 8270C		3223209	3223083
005	WG	SW846 8270C		3223209	3223083
006	WG	SW846 8270C		3223209	3223083
007	WG	SW846 8270C		3223209	3223083
008	WG	SW846 8270C		3223209	3223083

#### METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238

Work Order #...: FV2HF1AA

Matrix....: WATER

MB Lot-Sample #: D3H110000-209

Prep Date....: 08/11/03
Prep Batch #...: 3223209

Analysis Time..: 09:45

Analysis Date..: 09/03/03

Dilution Factor: 1

		REPORTI	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo (a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	NID .	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVERS	<u>r</u>	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	70	(30 - 16	50)	
Fluorene d-10	61	(36 - 12	27)	
Nanhthalana-de	-r	/27 1/		

(37 - 107)

NOTE(S):

Naphthalene-d8

Calculations are performed before rounding to avoid round-off errors in calculated results.

55

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238 Work Order #...: FV2HF1AC Matrix...... WATER

LCS Lot-Sample#: D3H110000-209

 Prep Date.....: 08/11/03
 Analysis Date..: 09/03/03

 Prep Batch #...: 3223209
 Analysis Time..: 10:22

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	72	(30 - 150)	SW846 8270C
Chrysene	74	(43 - 124)	SW846 8270C
Fluorene	72	(51 - 120)	SW846 8270C
Indene	62	(49 - 108)	SW846 8270C
2-Methylnaphthalene	62	(47 - 138)	SW846 8270C
Naphthalene	65	(43 - 128)	SW846 8270C
Quinoline	61	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12	_	73	(30 - 160)
Fluorene d-10		58	(36 - 127)
Naphthalene-d8		61	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### LABORATORY CONTROL SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238 Work Order #...: FV2HF1AC Matrix..... WATER

LCS Lot-Sample#: D3H110000-209

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	35.9	ug/L	72	SW846 8270C
Chrysene	50.0	37.1	ug/L	7 <b>4</b>	SW846 8270C
Fluorene	50.0	36.0	ug/L	72	SW846 8270C
Indene	50.0	30.8	ug/L	62	SW846 8270C
2-Methylnaphthalene	50.0	31.2	ug/L	62	SW846 8270C
Naphthalene	50.0	32.7	ug/L	65	SW846 8270C
Quinoline	50.0	30.6	ug/L	61	SW846 8270C
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS	_	
Chrysene-d12		73	(30 - 160	)	
Fluorene d-10		58	(36 - 127	)	
Naphthalene-d8		61	(37 - 107	)	

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238 Work Order #...: FVNAQ1AC-MS Matrix..... WG

MS Lot-Sample #: D3H050238-007 FVNAQ1AD-MSD

 Date Sampled...:
 08/04/03
 Date Received...:
 08/05/03

 Prep Date.....:
 08/11/03
 Analysis Date...:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time...:
 15:54

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	73	(30 ~ 150)	<u> </u>		SW846 8270C
	73	(30 - 150)	0.81	(0-30)	SW846 8270C
Chrysene	64	(43 - 124)			SW846 8270C
	68	(43 - 124)	8.2	(0-30)	SW846 8270C
Fluorene	98	(51 - 120)			SW846 8270C
	69	(51 - 120)	25	(0-30)	SW846 8270C
Indene	123 a	(49 - 108)			SW846 8270C
	68	(49 - 108)	20	(0-30)	SW846 8270C
2-Methylnaphthalene	87	(47 - 138)			SW846 8270C
	58	(47 - 138)	23	(0-30)	SW846 8270C
Naphthalene	433 a	(43 - 128)			SW846 8270C
	155 a	(43 - 128)	14	(0-30)	SW846 8270C
Quinoline	75	(40 - 126)			SW846 8270C
	70	(40 - 126)	5.0	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12	<del>_</del>	42		(30 - 160	· ·
		59		(30 - 160	)
Fluorene d-10		72		(36 - 127	)
		58		(36 - 127	)
Naphthalene-d8		76		(37 - 107	)
		65		(37 - 107	)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238 Work Order #...: FVNAQ1AC-MS Matrix...... WG

MS Lot-Sample #: D3H050238-007 FVNAQ1AD-MSD

 Date Sampled...:
 08/04/03
 Date Received..:
 08/05/03

 Prep Date.....:
 08/11/03
 Analysis Date..:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time..:
 15:54

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		F	ERCNT			
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	R	ECVRY	RPD	METHO	<u> </u>
Benzo(e) pyrene	ND	51.8	38.0	ug/L	7	13	•	SW846	8270C
	ND	52.6	38.3	ug/L	7	73	0.81	SW846	8270C
Chrysene	ND	51.8	33.1	ug/L	6	4		SW846	8270C
	ND	52.6	35.9	ug/L	6	8	8.2	SW846	8270C
Fluorene	12	51.8	62.7	ug/L	9	8		SW846	8270C
	12	52.6	48.8	ug/L	6	9	25	SW846	8270C
Indene	88	51.8	152	ug/L	1	.23 a		SW846	8270C
	88	<b>52.</b> 6	124	ug/L	6	8	20	SW846	8270C
2-Methylnaphthalene	26	51.8	71.3	ug/L	8	17		SW846	8270C
	26	52.6	56.8	ug/L	5	8	23	SW846	8270C
Naphthalene	880	51.8	1100	ug/L	4	33 a		SW846	8270C
	880	52.6	959	ug/L	1	.55 a	14	SW846	8270C
Quinoline	1.5	51.8	40.6	ug/L	7	5		SW846	8270C
	1.5	52.6	38.6	ug/L	7	0	5.0	SW846	8270C
		PE	ERCENT		RECO	VERY			
SURROGATE		RE	ECOVERY		LIMI	TS			
Chrysene-d12		42	2		(30	- 160)	<u> </u>		
		59	<del>)</del>		(30	- 160)	)		
Fluorene d-10		72	2		(36	- 127)	ŀ		
		58	3		(36	- 127)	ļ.		
Naphthalene-d8		76	5			- 107)			
-		65	5			- 107)			

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238 Work Order #...: FVQ5M1AC-MS Matrix..... WATER

MS Lot-Sample #: D3H060308-007 FVQ5M1AD-MSD

 Date Sampled...:
 08/05/03
 Date Received..:
 08/06/03

 Prep Date....:
 08/11/03
 Analysis Date..:
 09/04/03

 Prep Batch #...:
 3223209
 Analysis Time..:
 17:38

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	73	(30 - 150)			SW846 8270C
	100	(30 - 150)	24	(0-30)	SW846 8270C
Chrysene	73	(43 - 124)			SW846 8270C
	101	(43 - 124)	25	(0-30)	SW846 8270C
Fluorene	77	(51 - 120)			SW846 8270C
	95	(51 - 120)	14	(0-30)	SW846 8270C
Indene	44 a	(49 - 108)			SW846 8270C
	60	(49 - 108)	23	(0-30)	SW846 8270C
2-Methylnaphthalene	55	(47 - 138)			SW846 8270C
	75	(47 - 138)	23	(0-30)	SW846 8270C
Naphthalene	52	(43 - 128)			SW846 8270C
	71	(43 - 128)	23	(0-30)	SW846 8270C
Quinoline	75	(40 - 126)			SW846 8270C
	96	(40 - 126)	17	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE	_	RECOVERY		LIMITS	_
Chrysene-d12		64		(30 - 160	)
		82		(30 - 160	)
Fluorene d-10		61		(36 - 127	)
		76		(36 - 127	)
Naphthalene-d8		54		(37 - 107	)
		72		(37 - 107	)

#### NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H050238 Work Order #...: FVQ5M1AC-MS Matrix.....: WATER

MS Lot-Sample #: D3H060308-007 FVQ5M1AD-MSD

 Date Sampled...:
 08/05/03
 Date Received...:
 08/06/03

 Prep Date.....:
 08/11/03
 Analysis Date...:
 09/04/03

 Prep Batch #...:
 3223209
 Analysis Time...:
 17:38

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT			
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHO	D
Benzo (e) pyrene	ND	51.2	37.4	ug/L	73		SW846	8270C
	ND	47.4	47.6	ug/L	100	24	SW846	8270C
Chrysene	ND	51.2	37.4	ug/L	73		SW846	8270C
	ND	47.4	47.9	ug/L	101	25	SW846	8270C
Fluorene	ND	51.2	39.3	ug/L	77		SW846	8270C
	ND	47.4	45.2	ug/L	95	14	SW846	8270C
Indene	ND	51.2	22.4	ug/L	<b>44</b> a		SW846	8270C
	ND	47.4	28.3	ug/L	60	23	SW846	8270C
2-Methylnaphthalene	ND	51.2	28.2	ug/L	55		SW846	8270C
	ND	47.4	35.6	ug/L	75	23	SW846	8270C
Naphthalene	ND	51.2	26.7	ug/L	52		SW846	8270C
	ND	47.4	33.8	ug/L	71	23	SW846	8270C
Quinoline	ND	51.2	38.4	ug/L	75		SW846	8270C
	ND	47.4	45.3	ug/L	96	17	SW846	8270C
		Pi	ERCENT		RECOVERY			
SURROGATE		RI	ECOVERY		LIMITS			
Chrysene-d12		64	4		(30 - 160	<u> </u>		
_		82	2		(30 - 160)	)		
Fluorene d-10		6:	L		(36 - 127	}		
		76	5	•	(36 - 127	)		
Naphthalene-d8		54	1		(37 - 107)			
- <del> </del>		7:			(37 - 107			

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record

B/5/03



Severn Trent Laboratories, Inc.

STL-4124 (0901)	······································							
City of 51. Louis Park		Project Manager	Ander	(sor		8 4 03	Chain of Custody Numb	<u>51</u>
3752 Woodlake Ave		Telephone Number	er (Area Code)/Fa	2557		Lab Number	Page	of <u></u>
St. Law Park State Zip	55916	Site Contact Scott Av	Lai	Brian Stringer		lysis (Attach list if space is needed)		
Project Name and Location (State)		Carrier/Waybill No	umber		82		Special Inst	tructions/
Contract/Purchase Order/Quote No.		M	latrix	Containers & Preservatives			Conditions of	
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time single	Soil Chipres.	HUO3 HCI NaOH NaOH	12			
P307-080403	8403 8	50 X	3		X			
P112-080403	B	15					(PAH)	PPB
P309-080403		115						
P308-080403	0	150						
P308FB-080403	9	145						
P308FBD -080403	1 9	45	V	'	V			
Possible Hazard Identification  Non-Hazard   Flammable   Skin Irritant	☐ Poison B ☐	•	e Disposal turn To Client	Disposal By Lab	Archive For	(A fee may be as Months longer than 1 mo	ssessed if samples are reta onth)	uned
Turn Around Time Required				QC Requirements (Specify				
1. Relinguished By	iys 🔲 21 Days	Date Other	Time 1500	1. Received By	R. Vall	7		0840
2. Relinquished B	··· <del>·</del>	Date	Time	2. Received By	(1) inself	·	Date Ti	ime
3. Relinquished By	·	Date	Time	3. Received By			Date Ti	ime
Comments		<u></u>	L	L				

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

# Chain of Custody Record

2.7 8 03



Services Severn Trent Laboratories, Inc.

City OF ST. Louis Pank			ct Mar			1		<b>.</b> 1									Date	0/	103	7	Chain of	Custody	Number <b>7</b> 5	n
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3752 WOODDACE AVE						557			2 <i>92</i>	<b>.</b>	25	7.0				- 1	Lac IV	11 (1001			Page _	- [	_ of .	l
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roject Name and Location (State)	<u></u>		r/Way		lumb	er .	٠						٦_											
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Sample I.D. No. and Description Containers for each sample may be combined on one line)	Date	Time		Aquibais	Sed.	Soil	Unpres.	H2SO4	HNO3	ĘĊ	NaOH ZnAc/	Na OH	500	9										
W439-080403	8/4/03	0800		X			X					3			1									
4439D-680403	8/9/63	0805	1_	X			X					5	2 X			$\perp$								. <u>.</u> .
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#### **DATA QUALITY ASSESSMENT**

STL Project # D3H050238 (N)

March 1, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of eight aqueous samples for part per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on August 4, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H050238.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### SAMPLES

The samples included in this review are listed below:

P307-080403

P112-080403

P309-080403

P308-080403

P308FB-080403

P308FBD-080403

W439-080403

W439D-080403

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results



- Field duplicate results
- Quantitation limits and sample results

#### **DISCUSSION**

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.7-3.7°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, prep batch 3223209. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample W439-080403. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recoveries for Indene were 123% for the MS sample. The MS/MSD for Naphthalene had elevated recoveries. The MS sample had a recovery of 433% and the MSD sample had a recovery of 155%. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Naphthalene	433/155	ok	43-128/0-30
Indene	123/ok	ok	49-108/0-30



#### Field Duplicate Results

Sample W439-080403 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for all detected analytes. A total of 15 out of 31 compounds were detected with a RPD range of 0.0% to 36.7%.

#### **Quantitation Limits and Sample Results**

There were two samples analyzed using a dilution. W439-080403 and W439D-080403 were diluted by a factor of 10 due to elevated concentrations of target analytes. All reporting limits were adjusted accordingly.

All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.



#### ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H130303

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

**STL DENVER** 

Brian Stringer Project Manager

September 9, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> <li>Method/Analyst Summary</li> </ul>	<u> </u>
<ul> <li>Lot Sample Summary</li> <li>Analytical Results</li> <li>QC Data Association Summary</li> </ul>	
Chain-of-Custody	Check below when
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	supporting documentation is present.
Semivolatile GC/MS	
• Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
• Subcontracted Data	

### CASE NARRATIVE D3H130303

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

#### Sample Receiving

Eleven samples were received under chain of custody on August 12, 2003. The samples were received in good condition at temperatures of 3.4°C, 4.0°C and 2.8°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Samples D3H130303-005 and 006 were analyzed undiluted and then at dilutions due to high concentrations of target analytes in the samples. Analytes whose concentrations did not exceed the calibration range are reported from the undiluted analyses, while those compounds that required dilution are only reported from the diluted analyses. Naphthalene is reported in the undiluted analyses of sample 005 as "E" flagged to provide parent sample data in order to calculate recoveries for the MS/MSD performed on this sample. Surrogate recoveries were not reported for naphthalene due to the required dilution.

The MS/MSD performed on sample D3H130303-005 demonstrated recoveries that were below the control limits for naphthalene.

No other anomalies were observed.

# Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETENESS CALCULATION					
LOT:	D3H130303				
ANALYSIS:	ANALYSIS: PAHs by SW846-8270C				
QC Parameter	Data Planned	Valid Data Obtained			
Method Blank	31	31			
MB Surrogates	3	3			
LCS	7	7			
LCS Surrogates	3	3			
FB/FBD	62	62			
MS	7	6			
MS Surrogates	3	3			
MSD	7	6			
MSD Surrogates	. 3	3			
MS/MSD RPD	7	7			
Sample/Dup. RPD	31	31			
Sample Surrogates	33	33			
Samples and QC Internal Standard Area	42	42			
TOTAL	242	240			
% Completeness 99.2%					

<sup>\*</sup>A MS/MSD was performed on sample W420-081203

## Sample Duplicate Calculation for Method 8270C

Sample Duplicate RPD					
LOT D3H130303					
Sample: W420-081203		DUP: W420D-081203			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	130	Acenaphthene	130	0.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	1.9	Anthracene	2.0	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	33	2,3-Benzofuran	36	8.7	
Benzo(ghl)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	110	Benzo(b)thiophene	110	0.0	
Biphenyl	21	Biphenyl	22	4.7	
Carbazole	73	Carbazole	74	1.4	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	46	Dibenzofuran	47	2.2	
Dibenzothiophene	11	Dibenzothiophene	12	8.7	
2,3-Dihydroindene	210	2,3-Dihydroindene	230	9.1	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	48	Fluorene	52	8.0	
Indene	26	Indene	27	3.8	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	130	2-Methylnaphthalene	130	0.0	
1-Methylnaphthalene	130	1-Methylnaphthalene	140	7.4	
Naphthalene	1900	Naphthalene	2100	10.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	34	Phenanthrene	36	5.7	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3H130303

		Deponder**		AND CAMPAGE
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PARAMETER	RESULT	LIMIT	UNITS	METHOD
W420-081203 08/12/03 11:45 005				
Acenaphthene	130	10	ug/L	SW846 8270C
Anthracene	1.9 J	10	ug/L	SW846 8270C
2,3-Benzofuran	33	10	ug/L	SW846 8270C
Benzo(b) thiophene	110	10	ug/L	SW846 8270C
Biphenyl	21	10	ug/L	SW846 8270C
Carbazole	73	10	ug/L	SW846 8270C
Dibenzofuran	46	10	ug/L	SW846 8270C
Dibenzothiophene	11	10	ug/L	SW846 8270C
2,3-Dihydroindene	210	20	ug/L	SW846 8270C
Fluorene	48	10	ug/L	SW846 8270C
Indene	26 .	10	ug/L	SW846 8270C
2-Methylnaphthalene	130	10	ug/L	SW846 8270C
1-Methylnaphthalene	130	10	ug/L	SW846 8270C
Naphthalene	1300	10	ug/L	SW846 8270C
Naphthalene	1900	200	ug/L	SW846 8270C
Phenanthrene	34	10	ug/L	SW846 8270C
W420D-081203 08/12/03 11:50 006	120	10	/1	GWOAC BOOK
Acenaphthene	130	10	ug/L	SW846 8270C
Anthracene	2.0 J	10	ug/L	SW846 8270C
2,3-Benzofuran	36	10	ug/L	SW846 8270C
Benzo (b) thiophene	110	10	ug/L	SW846 8270C
Biphenyl Carbazole	22	10	ug/L	SW846 8270C
Dibenzofuran	74	10	ug/L	SW846 8270C
Dibenzoluran Dibenzothiophene	47	10	ug/L	SW846 8270C
<del>_</del>	12	10	ug/L	SW846 8270C
2,3-Dihydroindene 2,3-Dihydroindene	230 230	10 20	ug/L	SW846 8270C
Fluorene	230 52	· ·	ug/L	SW846 8270C
Indene		10	ug/L	SW846 8270C
	27	10	ug/L	SW846 8270C
2-Methylnaphthalene	130	10	ug/L	SW846 8270C
1-Methylnaphthalene	140	10	ug/L	SW846 8270C
Naphthalene Naphthalene	1200	10	ug/L	SW846 8270C
Phenanthrene	2100	200	ug/L	SW846 8270C
Phenanthrene	36	10	ug/L	SW846 8270C
W421-081203 08/12/03 12:05 007				
Acenaphthene	63	10	ug/L	SW846 8270C
Anthracene	4.3 J	10	ug/L	SW846 8270C
Benzo(a) anthracene	2.2 J	10	ug/L	SW846 8270C
Benzo(a) pyrene	1.1 J	10	ug/L	SW846 8270C
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(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

#### D3H130303

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W421-081203 08/12/03 12:05 007				
Benzo(b)thiophene	25	10	ug/L	SW846 8270C
Biphenyl	6.1 J	10	ug/L	SW846 8270C
Carbazole	32	10	ug/L	SW846 8270C
Chrysene	1.5 J	10	ug/L	SW846 8270C
Dibenzofuran	19	10	ug/L	SW846 8270C
Dibenzothiophene	4.7 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	72	10	ug/L	SW846 8270C
Fluoranthene	12	10	ug/L	SW846 8270C
Fluorene	30	10	ug/L	SW846 8270C
Indene	24	10	ug/L	SW846 8270C
2-Methylnaphthalene	15	10	ug/L	SW846 8270C
1-Methylnaphthalene	51	10	ug/L	SW846 8270C
Naphthalene	140	10	ug/L	SW846 8270C
Phenanthrene	39	10	ug/L	SW846 8270C
Pyrene	7.7 J	10	ug/L	SW846 8270C
W409-081203 08/12/03 11:15 008				
Acenaphthene	35	10	ug/L	SW846 8270C
Acenaphthylene	5.1 J	10	ug/L	SW846 8270C
Benzo(b)thiophene	17	10	ug/L	SW846 8270C
Biphenyl	4.0 J	10	ug/L	SW846 8270C
Carbazole	11	10	ug/L	SW846 8270C
Dibenzofuran	8.5 J	10	ug/L	SW846 8270C
Dibenzothiophene	1.4 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	23	10	ug/L	SW846 8270C
Fluoranthene	1.1 J	10	ug/L	SW846 8270C
Fluorene	15	10	ug/L	SW846 8270C
Indene	34	10	ug/L	SW846 8270C
1-Methylnaphthalene	39	10	ug/L	SW846 8270C
Naphthalene	7.6 J	10	ug/L	SW846 8270C
Phenanthrene	12	10	ug/L	SW846 8270C

# **METHODS SUMMARY**

#### D3H130303

	ANALYTICAL	PREPARATION
PARAMETER	METHOD	METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

#### D3H130303

ANALYTICAL METHOD	ANALYST	ANALYST ID
SW846 8270C	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## **SAMPLE SUMMARY**

#### D3H130303

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FV73Q	001	W438-081203	08/12/03	13:40
FV73W	002	W428-081203	08/12/03	16:15
FV730	003	W143-081203	08/12/03	17:00
FV731	004	W431-081203	08/12/03	15:20
FV734	005	W420-081203	08/12/03	11:45
FV74A	006	W420D-081203	08/12/03	11:50
FV74C	007	W421-081203	08/12/03	12:05
FV74G	800	W409-081203	08/12/03	11:15
FV74H	009	W409FB-081203	08/12/03	11:10
FV74K	010	W409FBD-081203	08/12/03	11:05
FV74Q	011	W131-081203	08/12/03	10:15
***************************************				

#### NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

#### Client Sample ID: W438-081203

#### GC/MS Semivolatiles

Lot-Sample #: D3H130303-001	Work Order #: FV73Q1AA	Matrix WG
Data Compled - 00/12/02	Date Deceived . 09/13/03	

 Date Sampled...:
 08/12/03
 Date Received...:
 08/13/03

 Prep Date....:
 08/19/03
 Analysis Date...:
 09/05/03

 Prep Batch #...:
 3231271
 Analysis Time...:
 15:02

Dilution Factor: 1

Method....: SW846 8270C

	Method: SW846 8270C		
		REPORTIN	iG
PARAMETER	RESULT	<u>LIMIT</u>	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b)fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	7
SURROGATE	RECOVERY	LIMITS	<del></del>
Chrysene-d12	62	(30 - 16	io)
Fluorene d-10	58	(36 - 12	17)
Naphthalene-d8	54	(37 - 10	77)

#### Client Sample ID: W428-081203

#### GC/MS Semivolatiles

Lot-Sample #: D3H130303-002 Date Sampled: 08/12/03	Work Order #: FV73W1AA Date Received: 08/13/03	Matrix: WG
Prep Date: 08/19/03	Analysis Date: 09/05/03	
Prep Batch #: 3231271	Analysis Time: 15:40	
Dilution Factor: 1		

Method.....: SW846 8270C

PARAMETER		•	REPORTIN	REPORTING	
Acenaphthylene	PARAMETER	RESULT	LIMIT	UNITS	
Acridine  Anthracene  ND  Anthracene  ND  Anthracene  ND  Denzo(a) anthracene  ND  Doug/L  Benzo(b) fluoranthene  ND  Doug/L  Benzo(k) fluoranthene  ND  Doug/L  Benzo(ghi) perylene  ND  Doug/L  Benzo(a) pyrene  ND  Doug/L  Benzo(a) pyrene  ND  Doug/L  Benzo(b) thiophene  ND  Doug/L  Benzo(b) thiophene  ND  Doug/L  Benzo(b) thiophene  ND  Doug/L  Benzo(b) thiophene  ND  Doug/L  Benzo(a) pyrene  ND  Doug/L  Benzo(b) thiophene  ND  Doug/L  Benzo(b) thiophene  ND  Doug/L  Carbazole  ND  Doug/L  Chrysene  ND  Doug/L  Chrysene  ND  Doug/L  Dibenzo(a, h) anthracene  ND  Doug/L  Dibenzothiophene  ND  Doug/L  2,3-Dihydroindene  ND  Doug/L  2,3-Dihydroindene  ND  Doug/L  Pluoranthene  ND  Doug/L  Indene  ND  Doug/L  Indene  ND  Doug/L  Indeno(1,2,3-cd) pyrene  ND  Doug/L  Indeno(1,2,3-cd) pyrene  ND  Doug/L	Acenaphthene	ND	10	ug/L	
Anthracene ND 10 ug/L Benzo (a) anthracene ND 10 ug/L Benzo (b) fluoranthene ND 10 ug/L Benzo (k) fluoranthene ND 10 ug/L Benzo (k) fluoranthene ND 10 ug/L 2,3-Benzofuran ND 10 ug/L Benzo (ghi) perylene ND 10 ug/L Benzo (e) pyrene ND 10 ug/L Benzo (b) thiophene ND 10 ug/L Benzo (b) thiophene ND 10 ug/L Biphenyl ND 10 ug/L Carbazole ND 10 ug/L Chrysene ND 10 ug/L Dibenzo (a, h) anthracene ND 10 ug/L Dibenzofuran ND 10 ug/L Dibenzofuran ND 10 ug/L Dibenzofuran ND 10 ug/L Dibenzofuran ND 10 ug/L Dibenzothiophene ND 10 ug/L Fluoranthene ND 10 ug/L Fluorene ND 10 ug/L Fluorene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L Indene ND 10 ug/L P-wethylnaphthalene ND 10 ug/L P-wethylnaphthalene ND 10 ug/L Perylene ND 10 ug/L Percent Recovery SURROGATE RECOVERY ENCOVERY SURROGATE RECOVERY LIMITS Chrysene-d12 62 (30 - 150)		ND	10	ug/L	
Benzo (a) anthracene   ND		ND	10	ug/L	
Benzo (b) fluoranthene	Anthracene	ND	10	ug/L	
Benzo (k) fluoranthene	Benzo(a) anthracene	ND	10	ug/L	
2,3-Benzofuran	Benzo(b) fluoranthene	ND	10	ug/L	
Benzo (ghi) perylene	Benzo(k) fluoranthene	ND	10	ug/L	
Benzo (a) pyrene	2,3-Benzofuran	ND	10	ug/L	
Benzo (e) pyrene	Benzo(ghi)perylene	ND	10	ug/L	
Benzo (b) thiophene	Benzo (a) pyrene	ND	10	ug/L	
Benzo (b) thiophene	Benzo(e) pyrene	ND	10	ug/L	
Carbazole         ND         10         ug/L           Chrysene         ND         10         ug/L           Dibenzo (a,h) anthracene         ND         10         ug/L           Dibenzofuran         ND         10         ug/L           Dibenzothiophene         ND         10         ug/L           2,3-Dihydroindene         ND         10         ug/L           Fluoranthene         ND         10         ug/L           Fluorene         ND         10         ug/L           Indene         ND         10         ug/L           Naphthalene         ND         10         ug/L </td <td>Benzo (b) thiophene</td> <td>ND</td> <td>10</td> <td>ug/L</td>	Benzo (b) thiophene	ND	10	ug/L	
Carbazole         ND         10         ug/L           Chrysene         ND         10         ug/L           Dibenzo (a,h) anthracene         ND         10         ug/L           Dibenzofuran         ND         10         ug/L           Dibenzothiophene         ND         10         ug/L           2,3-Dihydroindene         ND         10         ug/L           Fluoranthene         ND         10         ug/L           Fluorene         ND         10         ug/L           Indene         ND         10         ug/L           Indene         ND         10         ug/L           Indono (1, 2, 3-cd) pyrene         ND         10         ug/L           Indole         ND         10         ug/L           2-Methylnaphthalene         ND         10         ug/L           Naphthalene         ND         10         ug/L           Naphthalene         ND         10         ug/L           Perylene         ND         10         ug/L           Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         <	Biphenyl	ND	10	ug/L	
Chrysene         ND         10         ug/L           Dibenzo (a,h) anthracene         ND         10         ug/L           Dibenzofuran         ND         10         ug/L           Dibenzothiophene         ND         10         ug/L           2,3-Dihydroindene         ND         10         ug/L           Fluoranthene         ND         10         ug/L           Fluorene         ND         10         ug/L           Indene         ND         10         ug/L           Indene         ND         10         ug/L           Indene (1,2,3-cd) pyrene         ND         10         ug/L           Indene (1,2,3-cd) pyrene         ND         10         ug/L           2-Methylnaphthalene         ND         10         ug/L           1-Methylnaphthalene         ND         10         ug/L           Naphthalene         ND         10         ug/L           Perylene         ND         10         ug/L           Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L	Carbazole	ND	10		
Dibenzo (a, h) anthracene         ND         10         ug/L           Dibenzofuran         ND         10         ug/L           Dibenzothiophene         ND         10         ug/L           2,3-Dihydroindene         ND         10         ug/L           Fluoranthene         ND         10         ug/L           Fluorene         ND         10         ug/L           Indene         ND         10         ug/L           Indene (1,2,3-cd) pyrene         ND         10         ug/L           Indeno (1,2,3-cd) pyrene         ND         10         ug/L           2-Methylnaphthalene         ND         10         ug/L           2-Methylnaphthalene         ND         10         ug/L           Naphthalene         ND         10         ug/L           Naphthalene         ND         10         ug/L           Perylene         ND         10         ug/L           Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L           Percent         RECOVERY         LIMITS           Chrysen	Chrysene	ND	10		
Dibenzothiophene		ND	10	_	
2,3-Dihydroindene       ND       10       ug/L         Fluoranthene       ND       10       ug/L         Fluorene       ND       10       ug/L         Indene       ND       10       ug/L         Indeno(1,2,3-cd)pyrene       ND       10       ug/L         Indeno(1,2,3-cd)pyrene <td>Dibenzofuran</td> <td>ND</td> <td>10</td> <td>ug/L</td>	Dibenzofuran	ND	10	ug/L	
Fluoranthene	Dibenzothiophene	ND	10	ug/L	
Fluoranthene         ND         10         ug/L           Fluorene         ND         10         ug/L           Indene         ND         10         ug/L           Indeno (1,2,3-cd) pyrene         ND         10         ug/L	2,3-Dihydroindene	ND	10	ug/L	
Fluorene	Fluoranthene	ND	10	_	
Indeno(1,2,3-cd)pyrene	Fluorene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	Indene	ND	10	ug/L	
Indole	Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
2-Methylnaphthalene       ND       10       ug/L         1-Methylnaphthalene       ND       10       ug/L         Naphthalene       ND       10       ug/L         Perylene       ND       10       ug/L         Phenanthrene       ND       10       ug/L         Pyrene       ND       10       ug/L         Quinoline       ND       10       ug/L         PERCENT       RECOVERY         SURROGATE       RECOVERY       LIMITS         Chrysene-d12       62       (30 - 160)         Fluorene d-10       57       (36 - 127)		ND	10	_	
1-Methylnaphthalene         ND         10         ug/L           Naphthalene         ND         10         ug/L           Perylene         ND         10         ug/L           Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	2-Methylnaphthalene	ND	10		
Naphthalene         ND         10         ug/L           Perylene         ND         10         ug/L           Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	- <del>-</del>	ND	10	<del>-</del>	
Perylene         ND         10         ug/L           Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	_ <del>-</del>	ND	10	<del>-</del>	
Phenanthrene         ND         10         ug/L           Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	Perylene	ND	10	-	
Pyrene         ND         10         ug/L           Quinoline         ND         10         ug/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	Phenanthrene	ND	10	•	
Quinoline         ND         10         ug/L           PERCENT         RECOVERY           SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	Pyrene	ND	10		
SURROGATE         RECOVERY         LIMITS           Chrysene-d12         62         (30 - 160)           Fluorene d-10         57         (36 - 127)	Quinoline	ND	10	_	
Chrysene-d12 62 (30 - 160) Fluorene d-10 57 (36 - 127)		PERCENT	RECOVERY		
Fluorene d-10 57 (36 - 127)	SURROGATE	RECOVERY	LIMITS		
• • • • • • • • • • • • • • • • • • • •	Chrysene-d12	62	(30 - 16	0)	
Naphthalene-d8 53 (37 - 107)	Fluorene d-10	57	(36 - 12	7)	
	Naphthalene-d8	53	(37 - 10	7)	

#### Client Sample ID: W143-081203

#### GC/MS Semivolatiles

Lot-Sample #: D3H1	130303-003 Work Order	#: FV7301AA	Matrix: WG
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 Date Sampled...:
 08/12/03
 Date Received..:
 08/13/03

 Prep Date.....:
 08/19/03
 Analysis Date..:
 09/05/03

 Prep Batch #...:
 3231271
 Analysis Time..:
 16:17

Dilution Factor: 1

Naphthalene-d8

Method.....: SW846 8270C

	Method Swo40 62/00		
		REPORTIN	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b)fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	71	(30 - 16	0)
Fluorene d-10	60	(36 - 12	•
W		100	_;

58

(37 - 107)

#### Client Sample ID: W431-081203

	GC/MS Semivola	tiles	
Lot-Sample #: D3H130303-004	Work Order #:	FV7311AA	Matrix: WG
Date Sampled: 08/12/03	Date Received:	•	
Prep Date: 08/19/03	Analysis Date:		
Prep Batch #: 3231271	Analysis Time:	16:55	
Dilution Factor: 1			
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
	<u>.</u> .		

10

10

10

10

10

10

10

10

10

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

RY
160)
127)
107)

ND

ND

ND

ND

ND

ND

ND

ND

ND

Indene

Indole

Naphthalene

Phenanthrene

Perylene

Pyrene

Indeno(1,2,3-cd)pyrene

2-Methylnaphthalene

1-Methylnaphthalene

 $\mathcal{N}_{i}^{t} \times$ 

#### Client Sample ID: W420-081203

#### GC/MS Semivolatiles

Lot-Sample #: D3H130303-005	Work Order #: FV7341AA	Matrix: WG
Date Sampled: 08/12/03	Date Received: 08/13/03	
Prep Date: 08/19/03	Analysis Date: 09/05/03	
Prep Batch #: 3231271	Analysis Time: 17:32	
Dilution Factor: 1		

Method.....: SW846 8270C

PARAMETER	n peru m	REPORTING		
Acenaphthene	RESULT	LIMIT 10	UNITS ug/L	
Acenaphthylene	ND	10	ug/L ug/L	
Acridine	ND	10	ug/L ug/L	
Anthracene	и <i>р</i> 1.9 J	10	ug/L ug/L	
Benzo(a) anthracene	ND	10	ug/L ug/L	
Benzo(b) fluoranthene	ND	10	ug/L ug/L	
Benzo(k) fluoranthene	ND	10	ug/L ug/L	
2,3-Benzofuran	33	10 10	ug/L	
Benzo(ghi)perylene	NID	10	-	
	ND		ug/L	
Benzo (a) pyrene		10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo (b) thiophene	110	10	ug/L	
Biphenyl	<b>21</b>	10	ug/L	
Carbazole	73	10	ug/L	
Chrysene	ИD	10	ug/L	
Dibenzo (a, h) anthracene	ND	10	ug/L	
Dibenzofuran	46	10	ug/L	
Dibenzothiophene	11	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	48	10	ug/L	
Indene	26	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	130	10	ug/L	
1-Methylnaphthalene	130	10	ug/L	
Naphthalene	1300 B	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	34	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	51	(30 - 160	<del>-</del>	
Fluorene d-10	63	(36 - 100	-	
Naphthalene-d8	56	(36 - 127	-	
Maphenatene - 40	20	(3) - 10/	,	

#### I Estimated result. Result is less than RL.

NOTE (S):

E Estimated result. Result concentration exceeds the calibration range.

# Client Sample ID: W420-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-005 Date Sampled: 08/12/03 Prep Date: 08/19/03 Prep Batch #: 3231271 Dilution Factor: 2	Work Order #: Date Received: Analysis Date: Analysis Time:	08/13/03 09/07/03	Matrix: WG
	Method:	SW846 8270	С
DATAMETER	DEOUT E	REPORTING	INITES
PARAMETER 2,3-Dihydroindene	RESULT 210	LIMIT 20	UNITS ug/L
z, 5-binyurorimene	410	20	ug/ II
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	48	(30 - 160)	
Fluorene d-10	59	(36 - 127)	
Naphthalene-d8	53	(37 - 107)	

# Client Sample ID: W420-081203

# GC/MS Semivolatiles

<pre>Lot-Sample #: D3H130303-00 Date Sampled: 08/12/03 Prep Date: 08/19/03 Prep Batch #: 3231271 Dilution Factor: 20</pre>	Work Order #: Date Received Analysis Date Analysis Time	08/13/03	Matrix: WG
	Method	: SW846 8270	С
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Naphthalene	1900	200	ug/L
	PERCENT	RECOVERY	<u>.</u>
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	•
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W420D-081203

# GC/MS Semivolatiles

Lot-Sample #...: D3H130303-006 Work Order #...: FV74A1AA Matrix...... WG

10r-29ubie #: D2u120202-000	MOLK OLUCE #:		
Date Sampled: 08/12/03	Date Received:		
Prep Date: 08/19/03	Analysis Date:		
Prep Batch #: 3231271	Analysis Time:	19:24	
Dilution Factor: 1			
	Method:	SW846 8270	c
		DEDODMING	•
DATE AMERICAN	מי מי מי מי מי מי מי מי מי מי מי מי מי מ	REPORTING	INITEC
PARAMETER	RESULT 130	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene Acridine	ND	10	ug/L
	2.0 J	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene Benzo(b) fluoranthene	ND	10 10	ug/L
• •	ND	10	ug/L
Benzo (k) fluoranthene	36		ug/L
2,3-Benzofuran Benzo(ghi)perylene	ND	10	ug/L
		10	ug/L
Benzo(a)pyrene	ND ND	10	ug/L
Benzo (e) pyrene		10	ug/L
Benzo (b) thiophene	110	10	ug/L
Biphenyl	22	10	ug/L
Carbazole	74	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h) anthracene	ND	10	ug/L
Dibenzofuran	47	10	ug/L
Dibenzothiophene	12	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	52	10	ug/L
Indene	27	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	130	10	ug/L
1-Methylnaphthalene	140	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene -	36	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	65	(30 - 160)	
Fluorene d-10	68	(36 - 127)	
Naphthalene-d8	60	(37 - 107)	

J Estimated result. Result is less than RL.

# Client Sample ID: W420D-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-006 Date Sampled: 08/12/03 Prep Date: 08/19/03 Prep Batch #: 3231271 Dilution Factor: 2	Work Order #: Date Received: Analysis Date: Analysis Time:	08/13/03 09/08/03	Matrix WG
	Method:	SW846 8270	С
PARAMETER 2,3-Dihydroindene	RESULT	REPORTING LIMIT 20	UNITS ug/L
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Chrysene-d12	62	(30 - 160)	
Fluorene d-10	66	(36 - 127)	
Naphthalene-d8	60 -	(37 - 107)	

# Client Sample ID: W420D-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-006 Date Sampled: 08/12/03 Prep Date: 08/19/03 Prep Batch #: 3231271 Dilution Factor: 20	Work Order #: Date Received: Analysis Date: Analysis Time:	08/13/03 09/07/03	Matrix: WG
	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Naphthalene	2100	200	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W421-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-007 Date Sampled: 08/12/03 Prep Date: 08/19/03 Prep Batch #: 3231271 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method	08/13/03 09/05/03 20:01	Matrix WG
	Method:	5W646 62/U	
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	63	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	4.3 J	10	ug/L
Benzo (a) anthracene	2.2 J	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	1.1 J	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	25	1.0	ug/L
Biphenyl	6.1 J	10	ug/L
Carbazole	32	10	ug/L
Chrysene	1.5 J	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	19	10	ug/L
Dibenzothiophene	4.7 J	10	ug/L
2,3-Dihydroindene	72	10	ug/L
Fluoranthene	12	10	ug/L
Fluorene	30	10	ug/L
Indene	24	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	15	10	ug/L
1-Methylnaphthalene	51	10	ug/L
Naphthalene	140	10	ug/L
Perylene	ND	10	ug/L
Phenauthrene	39	10	ug/L
Pyrene	7.7 J	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	74	(30 - 160)	
Fluorene d-10	66	(36 - 127)	
Naphthalene-d8	55	(37 - 107)	

J Estimated result. Result is less than RL.

NOTE (S):

# Client Sample ID: W409-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-008 Date Sampled: 08/12/03 Prep Date: 08/19/03 Prep Batch #: 3231271 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/13/03 09/05/03	Matrix WG
	Method:	SW846 8270	OC .
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	35	10	ug/L
Acenaphthylene	5.1 J	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	17	10	ug/L
Biphenyl	4.0 J	10	ug/L
Carbazole	11	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	8.5 J	10	ug/L
Dibenzothiophene	1.4 J	10	ug/L
2,3-Dihydroindene	23	10	ug/L
Fluoranthene	1.1 J	10	ug/L
Fluorene	15	10	ug/L
Indene	34	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	39	10	ug/L
Naphthalene	7.6 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	12	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
OVODOGA III D	PERCENT	RECOVERY	
SURROGATE Character 212	RECOVERY	LIMITS	
Chrysene-d12	64	(30 - 160)	
Fluorene d-10	60	(36 - 127)	
Naphthalene-d8	59	(37 - 107)	

NOTE (S):

J Estimated result. Result is less than RL.

# Client Sample ID: W409FB-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-009	Work Order #: FV74H1AA	Matrix WG

Date Sampled...: 08/12/03 Date Received..: 08/13/03 Prep Date....: 08/19/03 Analysis Date..: 09/05/03 Prep Batch #...: 3231271 Analysis Time..: 21:16

Dilution Factor: 1

	Method	: SW846 827	70C
		REPORTING	<b>;</b>
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	72	(30 - 160	<del>)</del>
Fluorene d-10	57	(36 - 127	)
Naphthalene-d8	50	(37 - 107)	·

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	72	(30 - 160)
Fluorene d-10	57	(36 - 127)
Naphthalene-d8	50	(37 - 107)

# Client Sample ID: W409FBD-081203

# GC/MS Semivolatiles

	00,.2 20.2.02.0		
Lot-Sample #: D3H130303-010	Work Order #:	FV74K1AA	Matrix WG
Date Sampled: 08/12/03	Date Received:	08/13/03	
Prep Date: 08/19/03	Analysis Date:		
Prep Batch #: 3231271	Analysis Time:		
Dilution Factor: 1	•		
	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND .	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ממ	10	ug/L
Indene	ИD	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	76	(20 160)	

76

62

59

Chrysene-d12

Fluorene d-10

Naphthalene-d8

(30 - 160) (36 - 127) (37 - 107)

# Client Sample ID: W131-081203

# GC/MS Semivolatiles

Lot-Sample #: D3H130303-011	Work Order #: FV74Q1AA	Matrix WG
-----------------------------	------------------------	-----------

Date Received..: 08/13/03 Date Sampled...: 08/12/03 Prep Date....: 08/19/03 Analysis Date..: 09/05/03 Prep Batch #...: 3231271 Analysis Time..: 22:30

Dilution Factor: 1

Method..... SW846 8270C

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ИD	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	uq/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
			<b>J</b> ,
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	59	(30 - 160)	<u>-</u>
Fluorene d-10	56	(36 - 127)	
Naphthalene-d8	47	(37 - 107)	
•	<b>.</b>	,	

# QC DATA ASSOCIATION SUMMARY

#### D3H130303

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3231271	3231113
002	WG	SW846 8270C		3231271	3231113
003	WG	SW846 8270C		3231271	3231113
004	WG	SW846 8270C		3231271	3231113
005	WG	SW846 8270C		3231271	3231113
006	WG	SW846 8270C		3231271	3231113
007	WG	SW846 8270C		3231271	3231113
008	WG	SW846 8270C		3231271	3231113
009	WG	SW846 8270C		3231271	3231113
010	WG	SW846 8270C		3231271	3231113
011	WG	SW846 8270C		3231271	3231113

#### METHOD BLANK REPORT

# GC/MS Semivolatiles

Client Lot #...: D3H130303

Work Order #...: FWH3A1AA

Matrix....: WATER

MB Lot-Sample #: D3H190000-271

Prep Date....: 08/19/03
Prep Batch #...: 3231271

Analysis Time..: 11:55

Analysis Date..: 09/05/03

Dilution Factor: 1

		REPORTING	}	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a)anthracene	ND	10	ug/L	SW846 8270C
Benzo(b)fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k)fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo (e) pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo (a, h) anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	<b>N</b> D	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del></del>	
Chrysene-d12	77	(30 - 160	•	
Fluorene d-10	56	(36 - 127	')	
Naphthalene-d8	41	(37 - 107	<b>'</b> )	

NOTE (S):

#### LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H130303 Work Order #...: FWH3A1AC Matrix...... WATER

LCS Lot-Sample#: D3H190000-271

 Prep Date.....: 08/19/03
 Analysis Date..: 09/05/03

 Prep Batch #...: 3231271
 Analysis Time..: 12:32

Dilution Factor: 1

PARAMETER Benzo (e) pyrene Chrysene Fluorene Indene 2-Methylnaphthalene Naphthalene Quinoline	PERCENT RECOVERY 79 80 74 49 55 58	RECOVERY LIMITS (30 - 150) (43 - 124) (51 - 120) (49 - 108) (47 - 138) (43 - 128) (40 - 126)	METHOD SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C SW846 8270C
SURROGATE Chrysene-d12 Fluorene d-10 Naphthalene-d8		PERCENT RECOVERY 79 60 51	RECOVERY LIMITS (30 - 160) (36 - 127) (37 - 107)

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

#### LABORATORY CONTROL SAMPLE DATA REPORT

# GC/MS Semivolatiles

Client Lot #...: D3H130303 Work Order #...: FWH3A1AC Matrix..... WATER

LCS Lot-Sample#: D3H190000-271

Prep Date....: 08/19/03 Analysis Date..: 09/05/03
Prep Batch #...: 3231271 Analysis Time..: 12:32

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	39.3	ug/L	79	SW846 8270C
Chrysene	50.0	40.2	ug/L	80	SW846 8270C
Fluorene	50.0	37.0	ug/L	74	SW846 8270C
Indene	50.0	24.3	ug/L	49	SW846 8270C
2-Methylnaphthalene	50.0	27.7	ug/L	55	SW846 8270C
Naphthalene	50.0	28.8	ug/L	58	SW846 8270C
Quinoline	50.0	34.4	ug/L	69	SW846 8270C
		PERCENT	RECOVERY		

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	79	(30 - 160)
Fluorene d-10	60	(36 - 127)
Naphthalene-d8	51	(37 - 107)

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H130303 Work Order #...: FV7341AC-MS Matrix.....: WG

MS Lot-Sample #: D3H130303-005 FV7341AD-MSD

 Date Sampled...:
 08/12/03
 Date Received..:
 08/13/03

 Prep Date....:
 08/19/03
 Analysis Date..:
 09/05/03

 Prep Batch #...:
 3231271
 Analysis Time..:
 18:10

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	72	(30 - 150)			SW846 8270C
	74	(30 - 150)	2.6	(0-30)	SW846 8270C
Chrysene	73	(43 - 124)			SW846 8270C
	74	(43 - 124)	0.93	(0-30)	SW846 8270C
Fluorene	73	(51 - 120)			SW846 8270C
	82	(51 - 120)	5.2	(0-30)	SW846 8270C
Indene	53	(49 - 108)			SW846 8270C
	50	(49 - 108)	3.0	(0-30)	SW846 8270C
2-Methylnaphthalene	65	(47 - 138)			SW846 8270C
•	62	(47 - 138)	1.1	(0-30)	SW846 8270C
Naphthalene	0.0 a	(43 - 128)			SW846 8270C
	0.0 a	(43 - 128)	0.0	(0-30)	SW846 8270C
Quinoline	77	(40 - 126)			SW846 8270C
	78	(40 - 126)	1.6	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		62		(30 - 160	<del>))</del>
		52		(30 - 160	))
Fluorene d-10		67		(36 - 127	7)
		68		(36 - 127	7)
Naphthalene-d8		62		(37 - 107	<b>'</b> }
		59		(37 - 107	')

#### NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H130303

Work Order #...: FV7341AC-MS

MS Lot-Sample #: D3H130303-005

FV7341AD-MSD

Matrix....: WG

Date Sampled...: 08/12/03

Date Received..: 08/13/03

Prep Date....: 08/19/03

Analysis Date..: 09/05/03

Prep Batch #...: 3231271

Analysis Time..: 18:10

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT			
DADA MEMBO			•	IDITEO		222	METHOI	•
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD		-,,-,-
Benzo (e) pyrene	MD	53.4	38.5	ug/L	72			8270C
_	ND	53.5	39.5	ug/L	74	2.6	SW846	
Chrysene	ND	53.4	39.2	ug/L	73		SW846	
	ND	53.5	39.6	ug/L	74	0.93	SW846	
Fluorene	48	<b>53.4</b>	87.3	ug/L	73		SW846	8270C
	48	53.5	91.9	ug/L	82	5.2	SW846	8270C
Indene	26	53.4	54.1	ug/L	53		SW846	8270C
	26	53.5	52.5	ug/L	50	3.0	SW846	8270C
2-Methylnaphthalene	130	53.4	160	ug/L	65		SW846	8270C
	130	53.5	158	ug/L	62	1.1	SW846	8270C
Naphthalene	1300	53.4	1270	ug/L	0.0 a		SW846	8270C
	1300	53.5	1170	ug/L	0.0 a	0.0	SW846	8270C
Quinoline	ND	53.4	40.9	ug/L	77		SW846	8270C
	ND	53.5	41.6	ug/L	78	1.6	SW846	8270C
		PB	RCENT		RECOVERY			
SURROGATE		RE	COVERY		LIMITS			
Chrysene-d12	-	62			(30 - 160)	<u> </u>		
•		52			(30 - 160)			
Fluorene d-10		67			(36 - 127)			
-		68			(36 - 127)			
Naphthalene-d8		62			(37 - 107)			
		59			(37 - 107)			
		33			(3) - 10)	7		

#### NOTE (S)

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record



Services Severn Trent Laboratories, Inc.

STL-4124 (0901)								
City of St. Louis	Park	Project Mana	H AN	Herson			Dale   10   0 ]	Chain of Custody Number 150757
3753 _ Wooddale Ave		957		e)/Fax Number 2557			Lab Number	Page of
St. Louis Part My 3	341c	Site Contact	wesson	Lab Coppet	ion Salvingor	An moi	alysis (Attach list if re space is needed)	
Project Name and Location (State)		Carrier/Wayb	ill Number	<u> </u>				Special Instructions/
Contract/Purchase Order/Quote No.			Matrix		niners & rvatives	88		Conditions of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time 👌	Sed. Soi	Unpres. H2SO4 HNO3	Na OH Na OH Na OH	图		
W438-081203	8 12 03 13		X	2				(014
N 428-081203	16	15						1 (1741)
U143 - 081203	1:	700						Par
W431-081203		20	4	4		<b>V</b>		
			111		111			
			111					
Possible Hazard Identification	<u> </u>	Sa	mple Disposal	<del>                                     </del>			/A fee may be	assessed if samples are retained
Non-Hazard	Poison B 🔲 t	Jnknown 🗆	Return To Clier			Archive For	Months longer than 1 n	
Turn Around Time Hequired  24 Hours	us Dave	Other		OC Requi	irements (Specify			
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2. Helinquished by		Date	Time	2. Receiv	eo By		-	Date Time
3. Relinquished By		Date	Time	3. Receiv	ed By			Date Time
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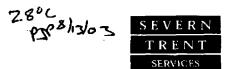


Services Severn Trent Laboratories, Inc.

STL-4124 (0901)																							
CITY OF ST. LOUIS PARK		Project	<u> </u>	20	77	4		FR.	Soy	J						Date	/ス・	03		(	Chain of Custody N 150	755	5
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STILDUIS PARK MW. 9	5416						au cu	тнасі						1 1	Analy more s	sis (A. space	itacn is ne	nst n eded) 	П		4		
Project Name and Location (State)		Carrier/	Waybi	ill Num	ber							1	¥								Special I	nstructi	ions/
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Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	₹	Aqueous Sed.	Soil	, longe	H2SO4	HNO3	HC!	NaOH	ZnAc/ NaOH	-	188										
W420 08-12-03	08-12-03	11:454		X		ā	2						X				$\perp$						
W420D 08-12-03	08-12-03	11:5844			<u> </u>	Ĩ	2					<u></u>	X								MARON	· ·	
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Possible Hazard Identification			Too		isposal																		
Mon-Hazard ☐ Flammable ☐ Skin Irritant	Poison B	☐ Unknown	1	•	nsposai n To Cli			Dispo	osal B	y La	b		rchive	For		Month		l fee m nger ti			sed if samples are	retained	
Turn Around Time Required									uiren								_						
24 Hours 48 Hours 7 Days 14 Da	iys 🔲 21 Day		er			==	$\perp$			_	_										<u> </u>		
1. Relinquished By		Date 08 -/	2 ~ <i>j</i> i	E	ime <b>7:30</b>	PM		Recei	ived	∃y 	d	L.									St.3lor	Time	5)>
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DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample: PINK - Field Copy

# Chain of **Custody Record**



SERVICES Severn Trent Laboratories, Inc.

STL-4124 (0901)															
City of St. Louis Park		Project Man	# 4	derso	m					]'	Date /	2/03		Chain of Custody N $150$	756
3759 Wooddal Are		Telephone I	Number (Are	ea Code)	Fax Nun	nber Z				ľ	Lab Num	ber		Page(	of <u>/</u>
SH. Louis Park WW 55	416	Site Contact	Anderso	n	ab Cont	act			·····	Analy more s	rsis (Atta space is	ach list if needed)			
Project Name and Location (State)		Carrier/Way	bill Number	· · ·				~						Special I	nstructions/
Contract/Purchase Order/Quote No.	····		Matrix			Contain Preserva								Condition	s of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date 7	īme 🔻	Agewous Sed.	Š	Unpres H2SO4	HZ HZ	NaOH ZNACI NaOH	7							
W409-08/203 8	12/03 11	15	X		2			×	1						
W409 FB -08 1203		0		] ]										1 84th	222
W409 FBD-081203	1110	05												1.	PPB
W131 -081203	10	15	4	1					4						
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Possible Hazard Identification		ļs	ample Disp	osal								/A foc =	av ha asso	ssed if samples are	retained
	Poison B 🔲 U	nknown [	Return T	o Client		isposal i			hive For		Months		han 1 monti		
Turn Around Time Required  24 Hours 48 Hours 7 Days 14 Days	21 Days	Other			aci	Require	nents (Sp	ecify)							
1. Religation of the following		Date 12/03	Time	00	1. A	eceived	Ву	) /						Date A 3 b	Time 30
2 Relinquish di By		Date	Time		2. Ri	eceived		~	T		<u></u>		<del></del>	Date Date	Time
3. Relinquished By		Date	Time	<del>,</del>	3. R	eceived	Ву		<u> </u>					Date	Time
Comments				<del>.</del>			<del>-</del>	·							<u></u>



#### **DATA QUALITY ASSESSMENT**

STL Project # D3H130303 (O)

March 1, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### **SUMMARY**

A data assessment was performed on the data for the analyses of 11 aqueous samples for part per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on August 12, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H130303.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W438-081203

W428-081203

W143-081203

W431-081203

W420-081203

W420D-081203

W421-081203

W409-081203

W409FB-081203

W409FBD-081203

W131-081203

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks



- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.8-4.0°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, prep batch 3231271. Target analytes were not detected in the laboratory method blank.

#### Surrogate Spike Recoveries

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample W420-081203. The following table summarizes the percent recoveries and/or the relative percent differences RPDs of the spiked target analytes that fell outside the QC acceptance limits. The percent recoveries for Naphthalene had recoveries of 0% for both the MS/MSD. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Naphthalene	0/0	ok	43-128/0-30



# Field Duplicate Results

Sample W420-081203 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for all detected analytes. A total of 15 out of 31 compounds were detected with a RPD range of 0.0% to 10.0%.

#### **Quantitation Limits and Sample Results**

Two of the samples were analyzed using a dilution. W420-081203 and W420D-081203 were diluted by a factor of 2 and 20 due to elevated concentrations of target analytes. All reporting limits were adjusted accordingly.

All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.



# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H120180

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Brian Stringer Project Manager

September 9, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> </ul>	
<ul><li>Methods Summary</li><li>Method/Analyst Summary</li></ul>	
<ul> <li>Lot Sample Summary</li> <li>Analytical Results</li> <li>QC Data Association Summary</li> <li>Chain-of-Custody</li> </ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
• Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
• Subcontracted Data	

# CASE NARRATIVE D3H120180

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

# Sample Receiving

Ten samples were received under chain of custody on August 12, 2003. The samples were received in good condition at temperatures of 3.2°C and 3.6°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Sample D3H120180-006 was analyzed undiluted and then at dilutions due to high concentrations of target analytes in the samples. Analytes whose concentrations did not exceed the calibration range are reported from the undiluted analyses, while those compounds that required dilution are only reported from the diluted analyses. Surrogate recoveries were not reported for naphthalene due to the required dilution.

The MS performed on sample D3H120180-007 demonstrated a recovery that was below the lower control limit for indene. The MSD was in control.

Due to a spike error when preparing sample D3H120180-008 for the CLLE extraction, the full scan spike was added to the sample instead of the correct surrogate. As per client request, the analysis for sample 008 was cancelled.

No other anomalies were observed.

# **Data Completeness for Method 8270C**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLET	ENESS CALC	ULATION
	D3H120180	
ANALYSIS:	PAHs by SW	/846-8270C
QC Parameter	Data	Valid Data
	Planned	Obtained
Method Blank	31	31
MB Surrogates	3	3
LCS	7	7
LCS Surrogates	3	3
FB/FBD	62	62
MS	7	6
MS Surrogates	3	3
MSD	7	7
MSD Surrogates	3	3
MS/MSD RPD	7	7
Sample/Dup. RPD	NA	NA
Sample Surrogates	27	27
Samples and QC	39	39
Internal Standard Area		
TOTAL	199	198
% Completeness	99.5%	

The reported MS/MSD was performed on sample W434 08-11-03. The field duplicate analysis was cancelled as described above.

# **EXECUTIVE SUMMARY - Detection Highlights**

D3H120180

		REPORTING		ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
W27-081103 08/11/03 15:30 001				
Acenaphthene	22	10	ug/L	SW846 8270C
Benzo(b) thiophene	2.3 J	10	ug/L	SW846 8270C
Biphenyl	3.8 J	10	ug/L	SW846 8270C
Carbazole	2.5 J	10	ug/L	SW846 8270C
Dibenzofuran	6.1 J	10	ug/L	SW846 8270C
2,3-Dihydroindene	18	10	ug/L	SW846 8270C
Fluorene	6.9 J	10	ug/L	SW846 8270C
Indene	5.6 J	10	ug/L	SW846 8270C
1-Methylnaphthalene	14	10	ug/L	SW846 8270C
Naphthalene	3.8 J	10	ug/L	SW846 8270C
W20-081103 08/11/03 14:25 002				
Naphthalene	5.4 J	10	ug/L	SW846 8270C
W426-081103 08/11/03 10:45 005				
Acenaphthene	86	10	ug/L	SW846 8270C
Anthracene	2.3 Л	10	ug/L	SW846 8270C
Benzo (b) thiophene	3.7 J	10	ug/L	SW846 8270C
Biphenyl	7.5 J	10	ug/L	SW846 8270C
Carbazole	16	10	ug/L	SW846 8270C
Dibenzofuran	20	10	ug/L	SW846 8270C
Dibenzothiophene	1.9 Ј	10	ug/L	SW846 8270C
2,3-Dihydroindene	20	10	ug/L	SW846 8270C
Fluoranthene	1.8 J	10	ug/L	SW846 8270C
Fluorene	35	10	ug/L	SW846 8270C
Indene	4.7 J	10	ug/L	SW846 8270C
1-Methylnaphthalene	54	10	ug/L	SW846 8270C
Naphthalene	2.7 Ј	10	ug/L	SW846 8270C
Phenanthrene	32	10	ug/L	SW846 8270C
Quinoline	1.5 J	10	ug/L	SW846 8270C
W437-081103 08/11/03 09:55 006				
Acenaphthene	190	20	ug/L	SW846 8270C
Acridine	11	10	ug/L	SW846 8270C
2,3-Benzofuran	1.9 J	10	ug/L	SW846 8270C
Benzo (b) thiophene	150	10	ug/L ug/L	SW846 8270C
Biphenyl	42	10	ug/L	SW846 8270C
Carbazole	120			
Dibenzofuran	66	10	ug/L	SW846 8270C
Dibenzothiophene	1.1 J	10	ug/L	SW846 8270C
proeuzocuropuene	T.T 7	10	ug/L	SW846 8270C

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3H120180

PARAMETER	RESULT	REPORTING LIMIT	<u>UNITS</u>	ANALYTICAL METHOD
W437-081103 08/11/03 09:55 006				
2,3-Dihydroindene	110	10	ug/L	SW846 8270C
Fluorene	68	10	ug/L	SW846 8270C
Indene	55	10	ug/L	SW846 8270C
2-Methylnaphthalene	150	10	ug/L	SW846 8270C
1-Methylnaphthalene	210	20	ug/L	SW846 8270C
Naphthalene	4800	400	ug/L	SW846 8270C
Phenanthrene	1.6 Ј	10	ug/L	SW846 8270C
W434-081103 08/11/03 13:00 007				
Acenaphthene	3.0 J	10	ug/L	SW846 8270C
W101-081103 08/11/03 13:30 009				
2,3-Dihydroindene	3.1 J	10	ug/L	SW846 8270C

# **METHODS SUMMARY**

# D3H120180

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

# D3H120180

ANALYTICAL METHOD	ANALYST	ANALYST ID
SW846 8270C	Tim O'Donnell	000443
References:		

SWB46

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

#### D3H120180

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FV4VV	001	W27-081103	08/11/03	15:30
FV4WC	002	W20-081103	08/11/03	14:25
FV4WE	003	W20FB-081103	08/11/03	14:15
FV4WL	004	W20FBD-081103	08/11/03	14:20
FV4WQ	005	W426-081103	08/11/03	10:45
FV4WV	006	W437-081103	08/11/03	09:55
FV4WW	007	W434~081103	08/11/03	13:00
FV4W6	009	W101-081103	08/11/03	13:30
FV4X0	010	W433-081103	08/11/03	12:20

#### NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pII, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: W27-081103

# GC/MS Semivolatiles

Lot-Sample #: D3H120180-001	Work Order #:	FV4VV1AA	Matrix: WATER
Date Sampled: 08/11/03	Date Received:		
Prep Date: 08/17/03	Analysis Date:	09/04/03	
Prep Batch #: 3229099	Analysis Time:	20:43	
Dilution Factor: 1	_		
	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	22	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo (ghi) perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	2.3 J	10	ug/L
Biphenyl	3.8 J	10	ug/L
Carbazole	2.5 J	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	6.1 J	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	18	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	6.9 J	10	ug/L
Indene	5.6 J	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	14	10	ug/L
Naphthalene	3.8 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	51	$\frac{617113}{(30 - 160)}$	
Fluorene d-10	50	(36 - 127)	
Naphthalene-d8	48	(37 - 107)	
Maphenatene-do	<del>4</del> 0	(2) - TOU	

J Estimated result. Result is less than RL.

NOTE(S):

# Client Sample ID: W20-081103

# GC/MS Semivolatiles

Lot-Sample #: D3H120180-002 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/12/03 09/04/03	Matrix WG
	Method:	SW846 8270	С
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	5.4 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	

RECOVERY

70

69

66

LIMITS

(30 - 160)

(36 - 127)

(37 - 107)

NOTE	(S)	:

SURROGATE

Chrysene-d12

Fluorene d-10

Naphthalene-d8

J Estimated result. Result is less than RL.

# Client Sample ID: W20FB-081103

#### GC/MS Semivolatiles

Lot-Sample #: D3H120180-003	Work Order #: FV4WE1AA	Matrix WG
-----------------------------	------------------------	-----------

Date Sampled...: 08/11/03 Date Received..: 08/12/03 Prep Date....: 08/17/03 Analysis Date..: 09/04/03 Prep Batch #...: 3229099 Analysis Time..: 21:57

Dilution Factor: 1

Method. - SW846 8270C

	Method: SW846 8270		)C
		REPORTING	
PARAMETER	RESULT	LIMIT_	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	na\r
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	76	(30 - 160)	)
Fluorene d-10	65	(36 - 127)	)
Naphthalene-d8	62	(37 - 107)	)

E 171/2-1711 T	TOTAL VILLE	
RECOVERY	<u>LIMITS</u>	
76	(30 - 160)	
65	(36 - 127)	
62	(37 - 107)	
	<u>RECOVERY</u> 76 65	

1

# Client Sample ID: W20FBD-081103

# GC/MS Semivolatiles

Lot-Sample #: D3	3H120180-004 W	Work Order #: F	V4WL1AA	Matrix WG

 Date Sampled...:
 08/11/03
 Date Received..:
 08/12/03

 Prep Date....:
 08/17/03
 Analysis Date..:
 09/04/03

 Prep Batch #...:
 3229099
 Analysis Time..:
 22:34

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTIN	<del></del>	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo(a) anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k)fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b)thiophene	ND	10	ug/L	
Biphenyl	ND	10	ug/L	
Carbazole	ND	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
2,3-Dihydroindene	ND	10	ug/L	
Fluoranthene	ИD	10	ug/L	
Fluorene	ND	10	ug/L	
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	ND	10	ug/L	
l-Methylnaphthalene	ND	10	ug/L	
Naphthalene	ND	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
			<b>J</b> ,	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	70	(30 - 160	<del>))</del>	
Pluorene d-10	59	(36 - 127	7)	

# Client Sample ID: W426-081103

# GC/MS Semivolatiles

Lot-Sample #: D3H120180-005 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099	Work Order #: Date Received: Analysis Date: Analysis Time:	08/12/03 09/04/03	Matrix WG
Dilution Factor: 1	Method:	SW846 8270	c
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	86	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	2.3 J	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b)fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	3.7 J	10	ug/L
Biphenyl	7.5 J	10	ug/L
Carbazole	16	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	20	10	ug/L
Dibenzothiophene	1.9 J	10	ug/L
2,3-Dihydroindene	20	10	ug/L
Fluoranthene	1.8 J	10	ug/L
Fluorene	35	10	ug/L
Indene	4.7 J	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	54	10	ug/L
Naphthalene	2.7 J	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene -	32	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	1.5 J	10	ug/L
CURROCA TO	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	64	(30 - 160)	
Fluorene d-10	60	(36 - 127)	
Naphthalene-d8	55	(37 - 107)	

J Estimated result. Result is less than RL.

NOTE (S):

# Client Sample ID: W437-081103

# GC/MS Semivolatiles

Lot-Sample #: D3H120180-006 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method:	08/12/03 09/04/03 23:48	Matrix: WG
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	ND	10	ug/L
Acridine	11	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	1.9 J	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	150	10	ug/L
Biphenyl	42	10	ug/L
Carbazole	120	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	66	10	ug/L
Dibenzothiophene	1.1 J	10	ug/L
2,3-Dihydroindene	110	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	68	10	ug/L
Indene	55	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	150	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	1.6 J	10	ug/L
Pyrene	ИD	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	67	(30 - 160)	
Fluorene d-10	67	(36 - 127)	
Naphthalene-d8	61	(37 - 107)	

J Estimated result. Result is less than RL.

NOTE (S):

# Client Sample ID: W437-081103

Lot-Sample #: D3H120180-006 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099 Dilution Factor: 2	Work Order #: Date Received: Analysis Date: Analysis Time:	08/12/03 09/05/03	Matrix WG
	Method:	SW846 8270	oc
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	190	20	ug/L
1-Methylnaphthalene	210	20	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	64	(30 - 160)	-
Fluorene d-10	64	(36 - 127)	
Naphthalene-d8	62	(37 - 107)	

# Client Sample ID: W437-081103

Lot-Sample #: D3H120180 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099 Dilution Factor: 40	-006 Work Order #  Date Received  Analysis Date  Analysis Time	: 08/12/03 : 09/07/03	Matrix WG
	Method	: SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Naphthalene	4800	400	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	•
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
NOTE (S):		_	

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W434-081103

Lot-Sample #: D3H120180-007 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/12/03 09/05/03	Matrix: WG
	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	3.0 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo (a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND ND	10	ug/L
Dibenzothiophene 2,3-Dihydroindene	ND ND	10 10	ug/L
Fluoranthene	ND	10	ug/L ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno (1,2,3-cd) pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ИD	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
¥ 0-110			~5/ <b>~</b>
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	61	(30 - 160)	
Fluorene d-10	59	(36 - 127)	
Naphthalene-d8	56	(37 - 107)	
-			

NOTE (S):

J Estimated result. Result is less than RL.

## Client Sample ID: W434 08-11-03

## GC/MS Semivolatiles

Lot-Sample #: D3H120180-007 Date Sampled: 08/11/03 Prep Date: 08/17/03 Prep Batch #: 3229099 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/12/03 09/05/03	Matrix: WG
Director ractors i	Method:	SW846 8270	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	3.0 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND .	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND .	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2 32-thed sambthal a	ATTS	1.0	- 1-

10

10

10

10

10

10

10

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-dl2	61	(30 - 160)
Fluorene d-10	59	(36 - 127)
Naphthalene-d8	5 <b>6</b>	(37 - 107)

ND

ND

ND

ND

ND

ND

ND

### NOTE(S):

2-Methylnaphthalene

1-Methylnaphthalene

Naphthalene

Phenanthrene

Perylene

Quinoline

Pyrene

J Estimated result. Result is less than RL.

## Client Sample ID: W101-081103

# GC/MS Semivolatiles

Lot-Sample #: D3H120180-009	Work Order #:	FV4W61AA	Matrix WG
Date Sampled: 08/11/03	Date Received:	08/12/03	
Prep Date: 08/17/03	Analysis Date:	09/05/03	
Prep Batch #: 3229099	Analysis Time:	13:47	
Dilution Factor: 1			
	Method:	SW846 8270	oc
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	3.1 J	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	70	(30 - 160)	
Fluorene d-10	64	(36 - 127)	
Naphthalene-d8	62	(37 - 107)	
-			

J Estimated result. Result is less than RL.

NOTE (S):

## Client Sample ID: W433-081103

## GC/MS Semivolatiles

Lot-Sample #: D3H120180-010 Work Order #: FV4X01AA Matrix: W	H120180-010 Work Order #: FV4X01AA Ma	Matrix Wo	3
--	---------------------------------------	-----------	---

 Date Sampled...:
 08/11/03
 Date Received...:
 08/12/03

 Prep Date.....:
 08/17/03
 Analysis Date...:
 09/05/03

 Prep Batch #...:
 3229099
 Analysis Time...:
 14:25

Dilution Factor: 1

Method....: SW846 8270C

	Method	: SW846 82	SW846 8270C		
		REPORTIN	r <b>G</b>		
PARAMETER	RESULT	LIMIT	UNITS		
Acenaphthene	ND	10	ug/L		
Acenaphthylene	ND	10	ug/L		
Acridine	ND	10	ug/L		
Anthracene	ND	10	ug/L		
Benzo(a) anthracene	ND	10	ug/L		
Benzo(b) fluoranthene	ND	10	ug/L		
Benzo(k) fluoranthene	ND	10	ug/L		
2,3-Benzofuran	ND	10	ug/L		
Benzo(ghi)perylene	ND	10	ug/L		
Benzo(a)pyrene	ND	10	ug/L		
Benzo(e)pyrene	ND	10	ug/L		
Benzo(b) thiophene	ND	10	ug/L		
Biphenyl	ND	10	ug/L		
Carbazole	ND	10	ug/L		
Chrysene	ND	10	ug/L		
Dibenzo(a,h)anthracene	ND	10	ug/L		
Dibenzofuran	ND	10	ug/L		
Dibenzothiophene	ND	10	ug/L		
2,3-Dihydroindene	ND	10	ug/L		
Fluoranthene	ND	10	ug/L		
Fluorene	ND	10	ug/L		
Indene	ND	10	ug/L		
Indeno(1,2,3-cd)pyrene	ND	10	ug/L		
Indole	ND	10	ug/L		
2-Methylnaphthalene	ND	10	ug/L		
1-Methylnaphthalene	ND	10	ug/L		
Naphthalene	ND	10	ug/L		
Perylene	ND	10	ug/L		
Phenanthrene	ND	10	ug/L		
Pyrene	ND	10	ug/L		
Quinoline	ND	10	ug/L		
		-	<b>3.</b> •		
	PERCENT	RECOVERY			
SURROGATE	RECOVERY	LIMITS			
Chrysene-d12	72	(30 - 16	0)		
Fluorene d-10	<b>6</b> 5	(36 - 12			
Naphthalene-d8	63	(37 - 10			

# QC DATA ASSOCIATION SUMMARY

## D3H120180

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	SW846 8270C		3229099	3229004
002	WG	SW846 8270C		3229099	3229004
003	WG	SW846 8270C		3229099	3229004
004	WG	SW846 8270C		3229099	3229004
005	WG	SW846 8270C		3229099	3229004
00 <i>6</i>	WG	SW846 8270C		3229099	3229004
007	WG	SW846 8270C		3229099	3229004
009	WG	SW846 8270C		3229099	3229004
010	WG	SW846 8270C		3229099	3229004

#### METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H120180 Work Order #...: FWFOM1AA Matrix.....: WATER

MB Lot-Sample #: D3H170000-099

Prep Date.....: 08/17/03 Analysis Time..: 14:54

Dilution Factor: 1

		REPORTI		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	1.0	ug/L	SW846 8270C
Benzo (ghi) perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVER:	Y	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	89	(30 - 16		
Fluorene d-10	67	(36 - 12		
Naphthalene-d8	69	(37 - 10	07)	

NOTE(S):

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H120180 Work Order #...: FWFOM1AC Matrix.....: WATER

LCS Lot-Sample#: D3H170000-099

Prep Date....: 08/17/03 Analysis Date..: 09/04/03 Prep Batch #...: 3229099 Analysis Time..: 15:31

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	85	(30 - 150)	SW846 8270C
Chrysene	85	(43 - 124)	SW846 8270C
Fluorene	83	(51 - 120)	SW846 8270C
Indene	62	(49 - 108)	SW846 8270C
2-Methylnaphthalene	68	(47 - 138)	SW846 8270C
Naphthalene	72	(43 - 128)	SW846 8270C
Quinoline	83	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	<u>LIMITS</u>
Chrysene-d12		83	(30 - 160)
Fluorene d-10		69	(36 - 127)
Naphthalene-d8		70	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H120180 Work Order #...: FWFOM1AC Matrix..... WATER

LCS Lot-Sample#: D3H170000-099

Prep Date....: 08/17/03 Analysis Date..: 09/04/03
Prep Batch #...: 3229099 Analysis Time..: 15:31

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	42.4	ug/L	85	SW846 8270C
Chrysene	50.0	42.4	ug/L	85	SW846 8270C
Fluorene	50.0	41.5	ug/L	83	SW846 8270C
Indene	50.0	31.1	ug/L	62	SW846 8270C
2-Methylnaphthalene	50.0	34.0	ug/L	68	SW846 8270C
Naphthalene	50.0	36.0	ug/L	72	SW846 8270C
Quinoline	50.0	41.5	ug/L	83	SW846 8270C
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS		
Chrysene-d12		83	(30 - 160)	,	
Fluorene d-10		69	(36 - 127)	)	
Naphthalene-d8		70	(37 - 107)	)	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H120180 Work Order #...: FV4WW1AC-MS Matrix...... WG

MS Lot-Sample #: D3H120180-007 FV4WW1AD-MSD

 Date Sampled...:
 08/11/03
 Date Received..:
 08/12/03

 Prep Date.....:
 08/17/03
 Analysis Date..:
 09/05/03

 Prep Batch #...:
 3229099
 Analysis Time..:
 01:01

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	71	(30 - 150)			SW846 8270C
	71	(30 - 150)	1.5	(0-30)	SW846 8270C
Chrysene	82	(43 - 124)			SW846 8270C
	68	(43 - 124)	19	(0-30)	SW846 8270C
Fluorene	69	(51 - 120)			SW846 8270C
	78	(51 - 120)	11	(0-30)	SW846 8270C
Indene	47 a	(49 - 108)			SW846 8270C
	54	(49 - 108)	11	(0-30)	SW846 8270C
2-Methylnaphthalene	59	(47 - 138)			SW846 8270C
	64	(47 - 138)	6.2	(0-30)	SW846 8270C
Naphthalene	58	(43 - 128)			SW846 8270C
	63	(43 - 128)	8.0	(0-30)	SW846 8270C
Quinoline	72	(40 - 126)			SW846 8270C
	75	(40 - 126)	2.3	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE	_	RECOVERY		LIMITS	_
Chrysene-d12	_	80		(30 - 160	<del>)</del>
		56		(30 - 160	)
Fluorene d-10		56		(36 - 127	)
		62		(36 - 127	)
Naphthalene-d8		54		(37 - 107	)
		59		(37 - 107	)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H120180 Work Order #...: FV4WW1AC-MS Matrix...... WG

MS Lot-Sample #: D3H120180-007 FV4WW1AD-MSD

 Date Sampled...:
 08/11/03
 Date Received..:
 08/12/03

 Prep Date.....:
 08/17/03
 Analysis Date..:
 09/05/03

 Prep Batch #...:
 3229099
 Analysis Time..:
 01:01

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	TMA	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	48.2	34.0	ug/L	71		SW846 8270C
	ND	47.4	33.5	ug/L	71	1.5	SW846 8270C
Chrysene	ND	48.2	39.4	ug/L	82		SW846 8270C
	ND ·	47.4	32.4	ug/L	68	19	SW846 8270C
Fluorene	ND	48.2	33.1	ug/L	69		SW846 8270C
	ND	47.4	36.8	ug/L	78	11	SW846 8270C
Indene	ND	48.2	22.9	ug/L	47 a		SW846 8270C
	ND	47.4	25.5	ug/L	54	11	SW846 8270C
2-Methylnaphthalene	ND	48.2	28.5	ug/L	59		SW846 8270C
	ND	47.4	30.4	ug/L	64	6.2	SW846 8270C
Naphthalene	ND	48.2	27.7	ug/L	5 <b>8</b>		SW846 8270C
	ND	47.4	30.0	ug/L	63	8.0	SW846 8270C
Quinoline	ND	48.2	34.6	ug/L	72		SW846 8270C
	ND	47.4	35.4	ug/L	75	2.3	SW846 8270C
		PE	RCENT		RECOVERY		
SURROGATE		RE	COVERY		LIMITS		
Chrysene-d12	-	80			(30 - 160)	<del>-</del>	
•		56	;		(30 - 160)		
Fluorene d-10		56	i		(36 - 127)	•	
		62	1		(36 - 127)	-	
Naphthalene-d8		54			(37 - 107)		
-		.59			(37 - 107)		
						•	

#### NOIR(2):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record

3.3° 18 8/12/03



**STL Deriver** 4955 Yarrow Street Arvada, CO 80002

STL-4124 (0901)																	•	_					
City of St. Louis Park		5	Manage	1	And										Date	(ii  c	3			Chain	289	201	
3753 Wooddale Aue		Teleph	one Nur	nber (	Araa Co	de)/Fa	75°	nber 5	7	-,					Lab I	Vumbe	r			Page	}	_ of _	
St. Louis Park State Zo	35416	Site Co	T A	એલા <u>ં</u>	50cm	4	Cont	ract V)	ΉÝ	ing	<b>y</b>			An moi	alysis e spac	Attac e is n	h list i eeded	f ()		$\Box$			
Project Name and Location (State)		Carrier	/Waybill	Numt	ber					7											Specia	i instructi	ons/
Contract/Purchase Order/Quote No.		•		Matr	rix			Conta Prese				1335	ŀ								Condition	ons of Re	ceipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	A.i.	38	ig S	Unpres.	H2SO4	HNO3	ğ	NaOH ZnAci	NaOH	支											
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DISTRIBUTION: WHITE - Returned to Client with Report: CANARY - Stays with the Sample; PINK - Field Copy

# Chain of Custody Record

8/12/03



Services Severn Trent Laboratories, Inc.

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#### **DATA QUALITY ASSESSMENT**

STL Project # D3H120180 (P)

March 1, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### **SUMMARY**

A data assessment was performed on the data for the analyses of nine aqueous samples for part per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on August 11, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H120180.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W27-081103

W20-081103

W20FB-081103

W20FBD-081103

W426-081103

W437-081103

W434-081103

W101-081103

W433-081103

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results



- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results

#### **DISCUSSION**

### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. Sample W434D-081103 was spiked incorrectly during sample preparation. The analysis for this sample was cancelled by the City of St. Louis Park. There were no other discrepancies to report.

## **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 3.2-3.6°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, batch 3229099. Target analytes were not detected in the laboratory method blank.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample W434-081103. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for Indene was 47% for the MS sample. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Indene	47/ok	ok	49-108/0-30



## **Field Duplicate Results**

No field duplicate samples were analyzed for this data package. The duplicate sample was incorrectly spiked and therefore cancelled by the City of St. Louis Park.

# **Quantitation Limits and Sample Results**

There was one sample analyzed using a dilution. W437-081103 was diluted by a factor of 2 and 40 due to elevated concentrations of target analytes. All reporting limits were adjusted accordingly.

All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

Q 1



# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H060308

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

**STL DENVER** 

Brian Stringer Project Manager

September 17, 2003

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Table of Contents	
Case Narrative	
<ul> <li>Executive Summary – Detection Highlights</li> </ul>	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
• Chain-of-Custody	
- Chain-or-Custouy	Check below when
Supporting Documentation	supporting
(Note: A one-page "Description of Supporting Documentation" is	documentation is
provided at the beginning of this section.).	present.
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General Chemistry	
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Radiochemistry	
Subcontracted Data	

# CASE NARRATIVE D3H060308

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Ten samples were received under chain of custody on August 6, 2003. The samples were received in good condition at temperatures of 3.0°C and 4.4°C.

#### GC/MS Semivolatiles, Method SW846 8270C

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The recoveries were above control limits for all three surrogates in sample D3H060308-004. This is an indication of a possible high bias in the sample. There is no evidence of matrix effects; therefore the sample was re-extracted past the 14-day holding time for the method. The client was contacted and both sets of results are reported here.

The MS/MSD associated with batch 3223209 was performed on sample D3H060308-007 and demonstrated recoveries that were below the control limits for indene in the MS. An additional batch MS/MSD was performed on a sample from another lot and demonstrated recoveries above the control limits for indene in the MS and naphthalene in the MS/MSD.

There was insufficient sample volume for MS/MSD with the re-extraction batch 3251281.

No other anomalies were observed.

# Data Completeness for Method 8270C

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETENESS CALCULATION									
LOT: D3H060308									
ANALYSIS:	PAHs by SW	846-8270C							
QC Parameter	Data	Valid Data							
	Planned	Obtained							
Method Blank	31	31							
MB Surrogates	3	3							
LCS	7	7							
LCS Surrogates	3	3							
FB/FBD	62	62							
MS	7	6							
MS Surrogates	3	3							
MSD	7	7							
MSD Surrogates	3	3							
MS/MSD RPD	7	7							
Sample/Dup. RPD	31	31							
Sample Surrogates	30	30							
Samples and QC	42	42							
Internal Standard Area									
TOTAL	236	235							
% Completeness	99.6%								

<sup>\*</sup> MS/MSD performed on sample W422-080503 used in calculation

# Sample Duplicate Calculation for Method 8270C

Sample Duplicate	<del> </del>		1	Ţ	
RPD	·			<del> </del>	
LOT D3H060308	<u> </u>	DUD MACOD COORCE	<u> </u>		
Sample: W422-080503		DUP: W422D-080503		1000	DDD: #00/
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	2.2	Acenaphthene	3.7	50.8	p*
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Велzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

p\* = calculated RPD is outside of control limits, however both results are below the reporting limits and are considered acceptable and the RPD is NA.

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3H060308

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
P310-080503 08/05/03 12:30 001				
Acenaphthene	12	10	ug/L	SW846 8270C
Carbazole	6.0 J	10	ug/L	SW846 8270C
P312-080503 08/05/03 08:55 004				
Acenaphthene	22	10	ug/L	SW846 8270C
Acenaphthene	5.6 J	10	ug/L	SW846 8270C
Carbazole	4.1 J	10	ug/L	SW846 8270C
Naphthalene	6.0 J	10	ug/L	SW846 8270C
W422-080503 08/05/03 09:20 007				
Acenaphthene	2.2 J	10	ug/L	SW846 B270C
W422D-080503 08/05/03 09:22 008				
Acenaphthene	3.7 J	10	ug/L	SW846 8270C

# **METHODS SUMMARY**

## D3H060308

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# METHOD / ANALYST SUMMARY

# D3H060308

ANALYTIC METHOD	AL	ANALYST	ANALYST ID
SW846 82	70C	Tim O'Donnell	000443
Reference	es:		
SW846		valuating Solid Waste, Physical/C tion, November 1986 and its updat	

# **SAMPLE SUMMARY**

## D3H060308

WO # &	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FVQ5C	001	P310-080503	08/05/03	12:30
FVQ5D	002	W117-080503	08/05/03	09:45
FVQ5E	003	W427-080503	08/05/03	11:15
FVQ5F	004	P312-080503	08/05/03	08:55
FVQ5H	005	P312FB-080503	08/05/03	08:45
FVQ5J	006	P312FBD-080503	08/05/03	08:50
FVQ5M	007	W422-080503	08/05/03	09:20
FVQ5Q	008	W422D-080503	08/05/03	09:22
FVQ5X	009	W136-080503	08/05/03	15:15
FVQ51	010	P109-080503	08/05/03	13:45

### NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: P310-080503

Lot-Sample #: D3H060308-001	Work Order #:		Matrix WG
Date Sampled: 08/05/03	Date Received:		
Prep Date: 08/11/03	Analysis Date:		
Prep Batch #: 3223209	Analysis Time:	17:45	
Dilution Factor: 1			_
	Method:	SW846 8270	ie .
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	12	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2.3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo (b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	6.0 J	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran -	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
######################################	<b>1127</b>	10	29, 1
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	73	(30 - 160)	
Fluorene d-10	86	(36 - 127)	
Naphthalene-d8	87	(37 - 107)	
		•	

NOTE (S):

J Estimated result. Result is less than RL.

# Client Sample ID: W117-080503

## GC/MS Semivolatiles

Lot-Sample #:	D3H060308-002	Work Order #: FVQ5D1AA	Matrix WG
Date Campled .	09/05/03	Date Peceived - 08/06/03	

 Date Sampled...:
 08/05/03
 Date Received...:
 08/06/03

 Prep Date.....:
 08/11/03
 Analysis Date...:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time...:
 18:22

Dilution Factor: 1

Method.....: SW846 8270C

		REPORTIN	TG .
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ИD	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ИD	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Ch 310	F 0	124 76	• • • •

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	59	(30 - 160)
Fluorene d-10	66	(36 - 127)
Naphthalene-d8	64	(37 - 107)

# Client Sample ID: W427-080503

## GC/MS Semivolatiles

Lot-Sample #: D3H060308-003	Work Order #: FVQ5E1AA	Matrix WG
Date Sampled: 08/05/03	Date Received: 08/06/03	

Prep Date....: 08/11/03 Analysis Date..: 09/03/03 Prep Batch #...: 3223209 Analysis Time..: 18:59 Dilution Factor: 1

Method - SW846 8270C

	Method	: SW846 8270	OC .
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	NID	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND .	. 10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ИD	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	.10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	$\mathtt{ug}/\mathtt{L}$
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	57	(30 - 160)	
Fluorene d-10	63	(36 - 127)	

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	57	(30 - 160)
Fluorene d-10	63	(36 - 127)
Naphthalene-d8	66	(37 - 107)

1713

# Client Sample ID: P312-080503

# GC/MS Semivolatiles

Lot-Sample #: D3H060308-004	Work Order #:	FVOSE1 AA	Matrix: WG
Date Sampled: 08/05/03	Date Received:		PRIOLEMINICAL NO
Prep Date: 08/11/03	Analysis Date:		
Prep Batch #: 3223209	Analysis Time:		
Dilution Factor: 1	raidijois iim,	10.55	
120001. 1	Method:	SW846 8270	n.c
	ile called a first a f	20010 0270	
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	22	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	4.1 J	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	6.0 J	10	ug/L
Perylene Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
Agruoting	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	268 *	(30 - 160)	
Fluorene d-10	208 *	(36 - 127)	
Naphthalene-d8	222 *	(37 - 107)	

NOTE (S):

Surrogate recovery is outside stated control limits.

I Estimated result. Result is less than RL.

# Client Sample ID: P312-080503

## GC/MS Semivolatiles

Lot-Sample #: D3H060308-004	Work Order #: FVQ5F2AA	Matrix WG
Date Sampled: 08/05/03	Date Received: 08/06/03	
Prep Date: 09/08/03	Analysis Date: 09/12/03	
Prep Batch #: 3251281	Analysis Time: 15:18	

Dilution Factor: 1 Method.....: SW846 8270C

	Method	: SW846 8270C		
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	5.6 J	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo(a) anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b)thiophene	ND	10	ug/L	
Biphenyl	ND	10	ug/L	
Carbazole	ND	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
2,3-Dihydroindene	ND	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	ND	10	ug/L	
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	ND	10	ug/L	
1-Methylnaphthalene	ND	10	ug/L	
Naphthalene	ND	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
			-	
CURROCA ME	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	69	(30 - 160)		
Fluorene d-10	69	(36 - 127)		
Naphthalene-d8	66	(37 - 107)		

J Estimated result. Result is less than RL.

NOTE(S):

# Client Sample ID: P312FB-080503

GC/MS Semivolatiles							
Lot-Sample #: D3H060308-005	Work Order #:	FVQ5H1AA	Matrix: WG				
Date Sampled: 08/05/03	Date Received:	08/06/03					
Prep Date: 08/11/03	Analysis Date:	09/03/03					
Prep Batch #: 3223209	Analysis Time:						
Dilution Factor: 1	<del>-</del>						
	Method:	SW846 8270C					
		REPORTING					
PARAMETER	RESULT	LIMIT	UNITS				
Acenaphthene	ИD	10	ug/L				
Acenaphthylene	ND	10	ug/L				
Acridine	ND	10	ug/L				
Anthracene	ND	10	ug/L				
Benzo (a) anthracene	ND	10	ug/L				
Benzo(b)fluoranthene	ND	10	ug/L				
Benzo(k)fluoranthene	ND	10	ug/L				
2,3-Benzofuran	ND	10	ug/L				
Benzo(ghi)perylene	ND	10	ug/L				
Benzo(a)pyrene	ND	10	ug/L				
Benzo(e)pyrene	ND	10	ug/L				
Benzo(b) thiophene	ND	10	ug/L				
Biphenyl	ND	10	ug/L				
Carbazole	ND	10	ug/L				
Chrysene	ND	10	ug/L				
Dibenzo(a,h) anthracene	ND	10	ug/L				
Dibenzofuran	ND	10	ug/L				
Dibenzothiophene	ND	10	ug/L				
2,3-Dihydroindene	ND	10	ug/L				
Fluoranthene	ND	10	ug/L				
Fluorene	ND	10	ug/L				

ug/L

ug/L

ug/L ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

10

10

10

10

10

10

10

10

10

Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	48	(30 - 160)	
Fluorene d-10	54	(36 - 127)	
Naphthalene-d8	51	(37 - 107)	

ND

ND

ND

ND

ND

ND

ND

ND

ND

Indene

Indole

Naphthalene

Phenanthrene

Perylene

Pyrene

Indeno(1,2,3-cd)pyrene

2-Methylnaphthalene

1-Methylnaphthalene

## Client Sample ID: P312FBD-080503

## GC/MS Semivolatiles

Lot-Sample #: D3H060308-006	Work Order #: FVQ5J1AA	Matrix WG
-----------------------------	------------------------	-----------

Date Received..: 08/06/03 Date Sampled...: 08/05/03 Prep Date....: 08/11/03 Analysis Date..: 09/03/03 Prep Batch #...: 3223209 Analysis Time..: 20:13

Dilution Factor: 1

Method. ..: SW846 8270C

	Method SW846 82		170C	
			REPORTING	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	10	ug/L	
Acenaphthylene	ND	10	ug/L	
Acridine	ND	10	ug/L	
Anthracene	ND	10	ug/L	
Benzo (a) anthracene	ND	10	ug/L	
Benzo(b) fluoranthene	ND	10	ug/L	
Benzo(k) fluoranthene	ND	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	ND	10	ug/L	
Benzo(a)pyrene	ND	10	ug/L	
Benzo(e)pyrene	ND	10	ug/L	
Benzo(b)thiophene	ND	10	ug/L	
Biphenyl	ND	10	ug/L	
Carbazole	ND	10	ug/L	
Chrysene	ND	10	ug/L	
Dibenzo(a,h)anthracene	ND	10	ug/L	
Dibenzofuran	ND	10	ug/L	
Dibenzothiophene	ND	10	ug/L	
2,3-Dihydroindene	ND	10	ug/L	
Fluoranthene	ND	10	ug/L	
Fluorene	ND	10	ug/L	
Indene	ND	10	ug/L	
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	
Indole	ND	10	ug/L	
2-Methylnaphthalene	ND	10	ug/L	
1-Methylnaphthalene	ND	10	ug/L	
Naphthalene	ND	10	ug/L	
Perylene	ND	10	ug/L	
Phenanthrene	ND	10	ug/L	
Pyrene	ND	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	_	
Chrysene-d12	66	(30 - 160)	<del>-</del> 	
Fluorene d-10	55	(36 - 127)	)	

PERCENT	KECOVEKI	
RECOVERY	LIMITS	
66	(30 - 160)	
55	(36 - 127)	
54	(37 - 107)	
	RECOVERY 66 55	

# Client Sample ID: W422-080503

# GC/MS Semivolatiles

Lot-Sample #: D3H060308-007	Work Order #:	FVOSM1 AA	Matrix WG
Date Sampled: 08/05/03	Date Received:		MACLIA
Prep Date: 08/11/03	Analysis Date:		
Prep Batch #: 3223209	Analysis Time:		
Dilution Factor: 1	marybra inc	20:43	
Diffucion Paccot: 1	Method:	CW046 0270	C.
	Mechod:	SW040 02/0	C
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	2.2 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo (a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo (e) pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	57	(30 - 160)	
Fluorene d-10	57	(36 - 127)	
Naphthalene-d8	52	(37 - 107)	
**		,_,,,	

## NOTE(S):

J Estimated result. Result is less than RL.

# Client Sample ID: W422D-080503

# GC/MS Semivolatiles

Tot Comple # . Danocoaca coa	Manla Ondon #	E110E01 N N	Wat air
Lot-Sample #: D3H060308-008	Work Order #:		Matrix WG
Date Sampled: 08/05/03	Date Received:		
Prep Date: 08/11/03	Analysis Date:		
Prep Batch #: 3223209 Dilution Factor: 1	Analysis Time:	18:52	
	Method:	SW846 8270	oc
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	3.7 J	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k)fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a)pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	61	(30 - 160)	
Fluorene d-10	61	(36 - 127)	
Nanhthalone - de	54	(27 107)	

54

(37 - 107)

# NOTE(S):

Naphthalene-d8

I Estimated result. Result is less than RL.

# Client Sample ID: W136-080503

## GC/MS Semivolatiles

Lot-Sample #: D3H060308-009	Work Order #: FVQ5X1AA	Matrix: WG
Date Sampled: 08/05/03	Date Received: 08/06/03	

Prep Batch #...: 3223209

Date Received.:: 08/06/03

Analysis Date.:: 09/04/03

Analysis Time.:: 19:29

Dilution Factor: 1

Method....: SW846 8270C

		REPORTIN	G
PARAMETER	RESULT	<u>LIMIT</u>	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a) anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	ug/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b) thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo (a, h) anthracene	ND	10	ug/L
Dibenzofuran	ND	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10	ug/L
Naphthalene	ND	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND	10	ug/L
Pyrene	ND	10	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	75	(30 - 16	0)
Fluorene d-10	66	(36 - 12	7)
Naphthalene-d8	59	(37 - 10)	7)

# QC DATA ASSOCIATION SUMMARY

# D3H060308

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C		3223209	3223083
002	WG	SW846 8270C		3223209	3223083
003	WG	SW846 8270C		3223209	3223083
004	wg Wg	SW846 8270C SW846 8270C		3223209 3251281	3223083
005	WG	SW846 8270C		3223209	3223083
006	WG	SW846 8270C		3223209	·
007	WG	SW846 8270C		3223209	3223083
800	WG	SW846 8270C		3223209	3223083
009	WG	SW846 8270C		3223209	3223083
010	WG	SW846 8270C		3223209	3223083

# Client Sample ID: P109-080503

# GC/MS Semivolatiles

Lot-Sample #: D3H060308-010	Work Order #:	FVQ511AA	Matrix WG
Date Sampled: 08/05/03	Date Received:	08/06/03	
Prep Date: 08/11/03	Analysis Date:	09/04/03	
Prep Batch #: 3223209	Analysis Time:	20:06	•
Dilution Factor: 1			
	Method:	SW846 8270	DC
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	10	ug/L
Acenaphthylene	ND	10	ug/L
Acridine	ND	10	ug/L
Anthracene	ND	10	ug/L
Benzo(a)anthracene	ND	10	ug/L
Benzo(b) fluoranthene	ND	10	ug/L
Benzo(k) fluoranthene	ND	10	ug/L
2,3-Benzofuran	ND	10	ug/L
Benzo(ghi)perylene	ND	10	ug/L
Benzo(a) pyrene	ND	10	uq/L
Benzo(e)pyrene	ND	10	ug/L
Benzo(b)thiophene	ND	10	ug/L
Biphenyl	ND	10	ug/L
Carbazole	ND	10	ug/L
Chrysene	ND	10	ug/L
Dibenzo(a,h)anthracene	ND	10	ug/L
Dibenzofuran	ND .	10	ug/L
Dibenzothiophene	ND	10	ug/L
2,3-Dihydroindene	ND	10	ug/L
Fluoranthene	ND	10	ug/L
Fluorene	ND	10	ug/L
Indene	ND	10	ug/L
Indeno(1,2,3-cd)pyrene	ND	10	ug/L
Indole	ND	10	ug/L
2-Methylnaphthalene	ND	10	ug/L
1-Methylnaphthalene	ND	10 .	ug/L
Naphthalene	ND .	10	ug/L
Perylene	ND	10	ug/L
Phenanthrene	ND .	10	ug/L
Pyrene	ND .	10 .	ug/L
Quinoline	ND	10	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	54	(30 - 160)	•
_ <del>-</del>			

62

48

(36 - 127)

(37 - 107)

Fluorene d-10

Naphthalene-d8

## METHOD BLANK REPORT

# GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FV2HF1AA Matrix.....: WATER

MB Lot-Sample #: D3H110000-209

Prep Date....: 08/11/03 Analysis Time..: 09:45

Dilution Factor: 1

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo(a)pyrene	ND	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b) thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del>_</del>	
Chrysene-d12	70	(30 - 160	•	
Fluorene d-10	61	(36 - 127	•	
Naphthalene-d8	55	(37 - 107	)	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FXTDA1AA Matrix.....: WATER

MB Lot-Sample #: D3I080000-281

Prep Date.....: 09/08/03 Analysis Time..: 14:03

Dilution Factor: 1

		REPORTING	3	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 8270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a) anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	ND	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo(a) pyrene	ND	10	ug/L	SW846 8270C
Benzo (e) pyrene	ND	10	ug/L	SW846 8270C
Benzo(b)thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND -	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ND	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	222			
arma can an	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS	<del>_</del>	
Chrysene-d12	81	(30 - 160	•	
Fluorene d-10	65	(36 - 127	-	
Naphthalene-d8	61	(37 - 107	)	

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FV2HF1AC Matrix.....: WATER

LCS Lot-Sample#: D3H110000-209

 Prep Date.....:
 08/11/03
 Analysis Date..:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time..:
 10:22

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	72	(30 - 150)	SW846 8270C
Chrysene	74	(43 - 124)	SW846 8270C
Fluorene	72	(51 - 120)	SW846 8270C
Indene	62	(49 - 108)	SW846 8270C
2-Methylnaphthalene	62	(47 - 138)	SW846 8270C
Naphthalene	65	(43 - 128)	SW846 8270C
Quinoline	61	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		73	(30 - 160)

58

61

(36 - 127)

(37 - 107)

Naphthalene-d8

Fluorene d-10

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FV2HF1AC Matrix..... WATER

LCS Lot-Sample#: D3H110000-209

 Prep Date....: 08/11/03
 Analysis Date..: 09/03/03

 Prep Batch #...: 3223209
 Analysis Time..: 10:22

Dilution Factor: 1

PARAMETER Benzo(e) pyrene Chrysene	SPIKE AMOUNT 50.0 50.0	MEASURED AMOUNT 35.9 37.1	UNITS ug/L ug/L	PERCENT RECOVERY 72 74	METHOD SW846 8270C SW846 8270C	_
Fluorene	50.0	36.0	ug/L	72	SW846 8270C	
Indene	50.0	30.8	ug/L	62	SW846 8270C	
2-Methylnaphthalene	50.0	31.2	ug/L	62	SW846 8270C	
Naphthalene	50.0	32.7	ug/L	65	SW846 8270C	
Quinoline	50.0	30.6	ug/L	61	SW846 8270C	
		PERCENT	RECOVERY		·	
SURROGATE		RECOVERY	LIMITS	_		
Chrysene-d12		73	(30 - 160)			
Fluorene d-10		58	(36 - 127)			
Naphthalene-d8		61	(37 - 107)	1		

NOTR(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FXTDA1AC Matrix...... WATER

LCS Lot-Sample#: D3I080000-281

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo (e) pyrene	79	(30 - 150)	SW846 8270C
Chrysene	78	(43 - 124)	SW846 8270C
Fluorene	80	(51 - 120)	SW846 8270C
Indene	59	(49 - 108)	SW846 8270C
2-Methylnaphthalene	61	(47 - 138)	SW846 8270C
Naphthalene	64	(43 - 128)	SW846 8270C
Quinoline	70	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		79	(30 - 160)
Fluorene d-10		64	(36 - 127)
Naphthalene-d8		60	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FXTDA1AC Matrix.....: WATER

LCS Lot-Sample#: D3I080000-281

 Prep Date....:
 09/08/03
 Analysis Date..:
 09/12/03

 Prep Batch #...:
 3251281
 Analysis Time..:
 14:40

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo (e) pyrene	50.0	39.5	ug/L	79	SW846 8270C
Chrysene	50.0	39.1	ug/L	78	SW846 8270C
Pluorene	50.0	40.2	ug/L	80	SW846 8270C
Indene	50.0	29.3	ug/L	59	SW846 8270C
2-Methylnaphthalene	50.0	30.7	ug/L	61	SW846 8270C
Naphthalene	50.0	32.2	ug/L	64	SW846 8270C
Quinoline	50.0	34.9	ug/L	70	SW846 8270C
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS		
Chrysene-d12		79	(30 - 160)	-	
Fluorene d-10		64	(36 - 127)		
Naphthalene-d8		60	(37 - 107)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FVQ5M1AC-MS Matrix...... WG

MS Lot-Sample #: D3H060308-007 FVQ5M1AD-MSD

 Date Sampled...:
 08/05/03
 Date Received..:
 08/06/03

 Prep Date.....:
 08/11/03
 Analysis Date..:
 09/04/03

 Prep Batch #...:
 3223209
 Analysis Time..:
 17:38

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	73	(30 - 150)		+	SW846 8270C
	100	(30 - 150)	24	(0-30)	SW846 8270C
Chrysene	73	(43 - 124)			SW846 8270C
	101	(43 - 124)	25	(0-30)	SW846 8270C
Fluorene	<b>7</b> 7	(51 - 120)			SW846 8270C
	95	(51 - 120)	14	(0-30)	SW846 8270C
Indene	44 a	(49 - 108)			SW846 8270C
	60	(49 - 108)	23	(0-30)	SW846 8270C
2-Methylnaphthalene	55	(47 - 138)			SW846 8270C
	<b>7</b> 5	(47 - 138)	23	(0-30)	SW846 8270C
Naphthalene	52	(43 - 128)			SW846 8270C
	71	(43 - 128)	23	(0-30)	SW846 8270C
Quinoline	<b>75</b>	(40 - 126)			SW846 8270C
	96	(40 - 126)	17	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		64		(30 - 160	<del>))</del>
		82		(30 - 160	)
Fluorene d-10		61		(36 - 127	·)
		76		(36 - 127	·)
Naphthalene-d8		54		(37 - 107	)
		72		(37 - 107	")

#### NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FVQ5M1AC-MS Matrix..... WG

MS Lot-Sample #: D3H060308-007 FVQ5M1AD-MSD

 Date Sampled...:
 08/05/03
 Date Received..:
 08/06/03

 Prep Date....:
 08/11/03
 Analysis Date..:
 09/04/03

 Prep Batch #...:
 3223209
 Analysis Time..:
 17:38

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	TUUOMA	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	51.2	37.4	ug/L	73		SW846 8270C
	ND	47.4	47.6	ug/L	100	24	SW846 8270C
Chrysene	ND	51.2	37.4	ug/L	73		SW846 8270C
	ND	47.4	47.9	ug/L	101	25	SW846 8270C
Fluorene	ND	51.2	39.3	ug/L	77		SW846 8270C
	ND	47.4	45.2	ug/L	95	14	SW846 8270C
Indene	ND	51.2	22.4	ug/L	44 a		SW846 8270C
	ND	47.4	28.3	ug/L	60	23	SW846 8270C
2-Methylnaphthalene	ND	51.2	28.2	ug/L	55		SW846 8270C
	ND	47.4	35.6	ug/L	75	23	SW846 8270C
Naphthalene	ND	51.2	26.7	ug/L	52		SW846 8270C
	ND	47.4	33.8	ug/L	71	23	SW846 8270C
Quinoline	ND	51.2	38.4	ug/L	75		SW846 8270C
	ND	47.4	45.3	ug/L	96	17	SW846 8270C

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	64	(30 - 160)
	82	(30 - 160)
Fluorene d-10	61	(36 - 127)
	76	(36 - 127)
Naphthalene-d8	54	(37 - 107)
	72	(37 - 107)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FVNAQ1AC-MS Matrix..... WATER

MS Lot-Sample #: D3H050238-007 FVNAQ1AD-MSD

 Date Sampled...:
 08/04/03
 Date Received..:
 08/05/03

 Prep Date.....:
 08/11/03
 Analysis Date..:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time..:
 15:54

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	73	(30 - 150)		•	SW846 8270C
	73	(30 - 150)	0.81	(0-30)	SW846 8270C
Chrysene	64	(43 - 124)			SW846 8270C
	68	(43 - 124)	8.2	(0-30)	SW846 8270C
Fluorene	98	(51 - 120)			SW846 8270C
	69	(51 - 120)	25	(0-30)	SW846 8270C
Indene	123 a	(49 - 108)			SW846 8270C
	68	(49 - 108)	20	(0-30)	SW846 8270C
2-Methylnaphthalene	87	(47 - 138)			SW846 8270C
	58	(47 - 138)	23	(0-30)	SW846 8270C
Naphthalene	<b>433</b> a	(43 - 128)			SW846 8270C
	155 a	(43 - 128)	14	(0-30)	SW846 8270C
Quinoline	75	(40 - 126)			SW846 8270C
	70	(40 - 126)	5.0	(0-30)	SW846 8270C
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12	<del></del>	42		(30 - 160	)
		59		(30 - 160	)
Fluorene d-10		72		(36 - 127	)
		58		(36 - 127	)
Naphthalene-d8		76		(37 - 107	)
		65		(37 - 107	)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

## MATRIX SPIKE SAMPLE DATA REPORT

# GC/MS Semivolatiles

Client Lot #...: D3H060308 Work Order #...: FVNAQ1AC-MS Matrix.....: WATER

MS Lot-Sample #: D3H050238-007 FVNAQ1AD-MSD

 Date Sampled...:
 08/04/03
 Date Received...:
 08/05/03

 Prep Date.....:
 08/11/03
 Analysis Date...:
 09/03/03

 Prep Batch #...:
 3223209
 Analysis Time...:
 15:54

Dilution Factor: 1

	03.477.7				_				
	SAMPLE	SPIKE	MEASRD		_	ERCNT			
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS		ECVRY	RPD	METHO	•
Benzo (e) pyrene	ND	51.8	38.0	ug/L	7	3		SW846	8270C
	ND	52.6	38.3	ug/L	7	3	0.81	SW846	8270C
Chrysene	ND	51.8	33.1	ug/L	6	4		SW846	8270C
	ND	52.6	35.9	ug/L	6	8	8.2	SW846	8270C
Fluorene	12	51.8	62.7	ug/L	9	8		SW846	8270C
	12	52.6	48.8	ug/L	6	9	25	SW846	8270C
Indene	88	51.8	152	ug/L	1	23 a		SW846	8270C
	88	52.6	124	ug/L	6	8	20	SW846	8270C
2-Methylnaphthalene	26	51.8	71.3	ug/L	8	7		SW846	8270C
	26	52.6	56.8	ug/L	5	8	23	SW846	8270C
Naphthalene	880	51.8	1100	ug/L		33 a		SW846	8270C
_	880	52.6	959	ug/L	1	55 a	14	SW846	8270C
Quinoline	1.5	51.8	40.6	ug/L	7	5		SW846	8270C
-	1.5	52.6	38.6	ug/L	7		5.0	SW846	8270C
		PI	ERCENT		RECO	VERY			
SURROGATE		RI	ECOVERY		LIMI'	TS			
Chrysene-d12	<del></del>	4:	2		(30	- 160)	-		
•		59	9		(30	- 160)	,		
Fluorene d-10		72			•	- 127)			
		58	=			- 127)			
Naphthalene-d8		76	_		•	- 107)			
		69			•	- 107) - 107)			

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.







# Services Severn Trent Laboratories, Inc.

STL-4124 (0901)									
City of St. Louis Parl	<u> </u>	Project Manage	H AW				5 5 03	Chain of Custody Number 15075	3
3752 Wooddale Aue		Telephone Num	924-2	557			Lab Number	Page of _	1
	55416	Site Contact	dason	Lah Contact	ffringer		nalysis (Attach list if ore space is needed)		
Project Name and Location (State)		Carrier/Waybill I	Vumber					Special Instruct	tions/
Contract/Purchase Order/Quote No.  0 (630 -0 31-			Matrix	Contair Preserv		1 1978		Conditions of Re	eceipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Sed.	Unpres. H2SO4 HNO3	NaOH ZnAc/ NaOH	22			
P310-080503	8/5/03	230 X		2		X			$\leq$
W 117-080503		145						1 (VAH oc	·
W427-080503	11	15						PP	13
P312-080503		355							
P312FB - 080503		45		$\Pi$					
P312 FBD -080503		350		14		<b>V</b>			
					1 1 1				
Possible Hazard Identification	1	Samp	le Disposal			<u> </u>	<del>                                     </del>	1	
Nen-Hazard	Poison B		eturn To Client		By Lab  ments (Specify	Archive For	(A fee may be a Months longer than 1 me	ssessed if samples are retained onth)	
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2. Relinquished By		Date	Time	2. Received	By FUNC	er (	<del>~7</del>	Date Time	
3. Relinquished By		Date	Time	3. Received	Ву	· ··		Date Time	
Comments		L	.4	<u> </u>					

# Chain of Custody Record

4.4°**18** 8/6/03



SERVICES Severn Trent Laboratories, Inc.

STL-4124 (0901)																										
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3752 WOODDAKE 1-WE		73	<u>2-</u>	92.	4-7	155	7	<u>91</u>	<u>z-</u>	97	4-	2.5	<u>57</u>	2								Pag	θ	<u> </u>	of _	$\Rightarrow$
	Code 55416	Site Co	ntaci	•	_		Lab							ysis (/ space					_							
Project Name and Location (State)		Carrier	Way	bill Nu	mber																		Spe	cial li	nstruct	ions/
Contract/Purchase Order/Quote No.	·			M	atrix				Cont					HAG-	•										s of Re	
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	₹	Aqueous	Sed	Soi	Unpres.	H2SO4	HNO3	ĘĊ	NaOH	ZnAc/ NaOH	*	866												
W422 -080503	8/5/03	0920		ㅅ								_	Z	X												
W422D - 080503	8/5/03	0922		X									2	X										-	1	$\overline{}$
W422M5- 080503	8/5/03	0925		×									Z	×									1	4	<u> </u>	$\overline{}$
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DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy



#### **DATA QUALITY ASSESSMENT**

STL Project # D3H060308 (Q)

March 2, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of ten aqueous samples for part per billion (ppb) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C. The samples were collected on August 12, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H060308.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

P310-080503

W117-080503

W427-080503

P312-080503

P312FB-080503

P312FBD-080503

W422-080503

W422D-080503

W136-080503

P109-080503

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries



- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

## **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

## **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 3.0 and 4.4°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There were two method blanks for this data package, prep batch 3223209 and 3251281. Target analytes were not detected in either of the laboratory method blanks.

## **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses except for sample P312-080503. All surrogate recoveries for this sample were above the control limits. The sample was re-extracted out of holding time per client request. The second extraction was within the acceptable range.

## **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

#### MS/MSD Results

MS/MSD analyses were performed on sample P308-080503. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for indene was 44% for the MS. All other recoveries and RPDs were within the acceptable range. An additional MS/MSD sample was run on a sample from another lot (W439-080403 from data package D3H050238) and demonstrated percent recoveries above the control limits for indene in the MS and naphthalene in the MS/MSD.



Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Indene	44/ok	ok	49-108/0-30
Indene	123/ok	ok	49-108/0-30
Naphthalene	433/155	ok	40-126/0-30

# **Field Duplicate Results**

The sample W420-081203 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for all detected analytes. A total of 15 out of 31 compounds were detected with a RPD range of 0.0% to 10.0%.

# **Quantitation Limits and Sample Results**

There were two samples that were analyzed using a dilution. W420-081203 and W420D-081203 were diluted by a factor of 2 and 20 due to elevated concentrations of target analytes. All reporting limits were adjusted accordingly.

All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.



# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H190227

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Gail DeRuzzo
Project Manager

September 30, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> <li>Analytical Results</li> </ul>	
<ul> <li>QC Data Association Summary</li> <li>Chain-of-Custody</li> </ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
Subcontracted Data	

# CASE NARRATIVE D3H190227

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Eight samples were received under chain of custody on August 19, 2003. The samples were received in good condition at temperatures of 2.8, 2.6, 3.2, 2.1, and 3.2°C.

## GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The surrogate recovery of Fluorene-d10 was below the 30% threshold for samples D3H190227-002, 003, the Method Blank, and the MS/MSD of sample D3H190227-001. The surrogate recovery of Chrysene-d12 was below the 30% threshold for sample D3H190227-008.

The analytes Naphthalene and Phenanthrene were detected in the Method Blank below the project-specific reporting limits. Associated sample results are flagged "B".

The Laboratory Control Sample could not be analyzed and reported because the vial containing the extract was found to be cracked and the LCS was evaporated. There was insufficient sample volume to re-extract the samples and the holding time has expired. The client was notified.

The MS/MSD performed on sample D3H190227-001 demonstrated recoveries that were below the control limits for Benzo(e)pyrene and Quinoline. In addition the relative percent difference (RPD) was outside control limits for Quinoline.

No other anomalies were observed.

# **Data Completeness for Method 8270C SIM**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLET		ULATION
LOT:	D3H190227	
ANALYSIS:	SW846-8270	C SIM
QC Parameter	Data Planned	Valid Data Obtained
Method Blank	31	29
MB Surrogates	3	2
LCS	7	0
LCS Surrogates	3	0
FB/FBD	62	58
MS	7	5
MS Surrogates	3	2
MSD	7	6
MSD Surrogates	3	2
MS/MSD RPD	7	6
Sample/Dup. RPD	31	31
Sample Surrogates	24	21
Samples and QC Internal Standard Area	33	33
TOTAL	221	195
% Completeness	88.2%	

<sup>\*</sup>A MS/MSD was performed on sample E3-081803.

# Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD					<u> </u>
LOT D3H190227				-	
Sample: E3-081803		DUP: E3D-081803			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	ND	Acenaphthene	ND	0.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	ļ
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	1.1	Naphthalene	1.0	9.5	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference
ND = Compound not detected in the sample
p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3H190227

			REPORTING		ANALYTICAL					
PARAMETER		RESULT	LIMIT	UNITS	METHOD					
FARAPIETER		KESULI		ONIIB	METHOD					
E3-081803 08/18/0	3 11:45 001									
Naphthalene	<b>e</b>	1.1 J,B	8.6	ng/L	SW846 8270C SIM					
E3D-081803 08/18/	03 11:50 002									
Naphthalen	<b>e</b> .	1.0 Ј,В	8.6	ng/L	SW846 8270C SIM					
E3FBD-081803 08/1	B/03 12:10 004									
Fluoranthe	ne	1.6 J	4.6	ng/L	SW846 8270C SIM					
Naphthalene	e .	1.5 J,B	8.6	ng/L	SW846 8270C SIM					
Phenanthre	ne	1.1 J,B	6.3	ng/L	SW846 8270C SIM					
Pyrene		1.2 J	4.2	ng/L	SW846 8270C SIM					
E2-081803 08/18/03	3 11:25 005									
2,3-Dihydro	oindene	1.2 J	5.0	ng/L	SW846 8270C SIM					
Fluoranther		1.1 J	4.6	ng/L	SW846 8270C SIM					
Naphthalene	2	1.5 J,B	8.6	ng/L	SW846 8270C SIM					
Phenanthre		1.0 J,B	6.3	ng/L	SW846 8270C SIM					
Pyrene		1.4 J	4.2	ng/L	SW846 8270C SIM					
Quinoline		1.4 J	9.0	ng/L	SW846 8270C SIM					
E13-081803 08/18/0	03 11:00 006									
Acenaphther	ie .	43	5.7	ng/L	SW846 8270C SIM					
Acenaphthy]	lene	7.6	4.8	ng/L	SW846 8270C SIM					
Benzo (a) ant	thracene	1.0 J	4.3	ng/L	SW846 8270C SIM					
Benzo(b) flu	ioranthene	1.0 J	4.7	ng/L	SW846 8270C SIM					
Benzo(k) flu	ıoranthene	1.4 J	4.1	ng/L	SW846 8270C SIM					
Benzo(ghi)p	perylene	0.96 J	6.2	ng/L	SW846 8270C SIM					
Benzo (a) pyr	rene	1.0 J	2.5	ng/L	SW846 8270C SIM					
Benzo (e) pyr	rene	1.0 J	4.3	ng/L	SW846 8270C SIM					
Chrysene		1.5 J	5.6	ng/L	SW846 8270C SIM					
Dibenzothic	phene	1.3 J	4.1	ng/L	SW846 8270C SIM					
2,3-Dihydro	oindene	12	5.0	ng/L	SW846 8270C SIM					
Fluoranthen		3.7 J	4.6	ng/L	SW846 8270C SIM					
Fluorene		13	4.1	ng/L	SW846 8270C SIM					
Indole		1.6 J	4.7	ng/L	SW846 8270C SIM					
Naphthalene	<b>:</b>	1.4 J,B	8.6	ng/L	SW846 8270C SIM					
Phenanthren		1.0 J,B	6.3	ng/L	SW846 8270C SIM					
Pyrene		2.9 J	4.2	ng/L	SW846 8270C SIM					
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# **EXECUTIVE SUMMARY - Detection Highlights**

# D3H190227

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
E7-081803 08/18/03 10:20 007				
Acenaphthene	7.1	5.7	ng/L	SW846 8270C SIM
Acridine	4.2 J	6.2	ng/L	SW846 8270C SIM
Benzo(b) thiophene	1.5 J	5.2	ng/L	SW846 8270C SIM
2,3-Dihydroindene	2.8 J	5.0	ng/L	SW846 8270C SIM
Fluoranthene	1.0 J	4.6	ng/L	SW846 8270C SIM
Indene	1.8 J	4.7	ng/L	SW846 8270C SIM
Naphthalene	2.0 J,B	8.6	ng/L	SW846 8270C SIM
Quinoline	1.8 J	9.0	ng/L	SW846 8270C SIM
E15-081803 08/18/03 10:40 008				
Acenaphthene	2.2 J	5.7	ng/L	SW846 8270C SIM
Fluoranthene	1.4 J	4.6	ng/L	SW846 8270C SIM
Naphthalene	1.8 J,B	8.6	ng/L	SW846 8270C SIM

# **METHODS SUMMARY**

## D3H190227

ANALYTICAL PREPARATION
PARAMETER

Base/Neutrals and Acids

SW846 8270C SIM SW846 3520C

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

## D3H190227

ANALYTICAL		ANALYST
METHOD	ANALYST	ID
SW846 8270C SIM	Tim O'Donnell	000443

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

## D3H190227

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FWJH9	001	E3-081803	08/18/03	11:45
FWJJL	002	E3D-081803	08/18/03	11:50
FWJJM	003	E3FB-081803	08/18/03	12:05
FWJJP	004	E3FBD-081803	08/18/03	12:10
FWJJQ	005	E2-081803	08/18/03	11:25
FWJJV	006	E13-081803	08/18/03	11:00
FWJJW	007	E7-081803	08/18/03	10:20
FWJJX	008	E15-081803	08/18/03	10:40

## NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: E3-081803

# GC/MS Semivolatiles

Lot-Sample #: D3H190227-001 Date Sampled: 08/18/03	Work Order #: Date Received:		Matrix WG
Prep Date: 08/22/03	Analysis Date:	09/28/03	
Prep Batch #: 3234377	Analysis Time:	17:48	
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
•			
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a)anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	NID .	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.1 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
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	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	37	(30 - 118)	
Fluorene d-10	34 *	(41 - 162)	
Naphthalene-d8	50	(30 - 108)	
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# NOTE (S):

Surrogate recovery is outside stated control limits.

I Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: E3D-081803

# GC/MS Semivolatiles

Lot-Sample #: D3H190227-002 Date Sampled: 08/18/03	Date Received:	08/19/03	Matrix: WG
Prep Date: 08/22/03	Analysis Date:	09/28/03	
Prep Batch #: 3234377	Analysis Time:	19:40	
Dilution Factor: 1			
	Method:	SW846 8270	OC SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	nq/L
Naphthalene	1.0 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	31	(30 - 118)	
Fluorene d-10	20 +	(41 100)	

# NOTE(S):

Fluorene d-10

Naphthalene-d8

29 \*

39

(41 - 162)

(30 - 108)

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

# Client Sample ID: E3FB-081803

# GC/MS Semivolatiles

Tot Cample # - D2U100227.002	Work Order #:	ኒመኒያ ፓ ፕሎያን እ አ	Matrix WG
Lot-Sample #: D3H190227-003 Date Sampled: 08/18/03	Date Received:		Matrix wg
Prep Date: 08/22/03	Analysis Date:	•	
Prep Batch #: 3234377	Analysis Time:		
Dilution Factor: 1	Audiysis line:	20:17	
Dilucion Factor: 1	Method:	CWOAE 9270	OC STM
	recinou	5W040 02/0	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	80	(30 - 118)	
Pluorene d-10	26 *	(41 - 162)	
Naphthalene-d8	37	(30 - 108)	

# NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

# Client Sample ID: E3FBD-081803

## GC/MS Semivolatiles

Lot-Sample #: D3H190227-004	Work Order #: FWJJP1AA	Matrix WG
Date Sampled: 08/18/03	Date Received: 08/19/03	

Dilution Factor: 1

Method.....: SW846 8270C SIM

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		REPORTING	3
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	1.6 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.5 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.1 Ј,В	6.3	ng/L
Pyrene	1.2 J	4.2	ng/L
Quinoline	ND	9.0	ng/L
<del>-</del>			
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	65	(30 - 118	3)
Fluorene d-10	45	(41 - 162	?)
Naphthalene-d8	53	(30 - 108	
-		•	

## NOTE (S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: E2-081803

# GC/MS Semivolatiles

Lot-Sample #: D3H190227-005	Work Order #:	FWJJ01AA	Matrix: WG
Date Sampled: 08/18/03	Date Received:	- <del>-</del>	
Prep Date: 08/22/03	Analysis Date:		
Prep Batch #: 3234377	Analysis Time:		
Dilution Factor: 1	•		
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a)anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	1.2 J	5.0	ng/L
Fluoranthene	1.1 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.5 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.0 J,B	6.3	ng/L
Pyrene	1.4 J	4.2	ng/L
Quinoline	1.4 J	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	43	(30 - 118)	
Fluorene d-10	40 *	(41 - 162)	
M			

## NOTE(S):

Naphthalene-d8

57

(30 - 108)

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: E13-081803

## GC/MS Semivolatiles

Lot-Sample #: D3H190227-006	Work Order #:	FWJJV1AA	Matrix WG
Date Sampled: 08/18/03	Date Received:	08/19/03	
Prep Date: 08/22/03	Analysis Date:	09/26/03	
Prep Batch #: 3234377 Dilution Factor: 1	Analysis Time:	22:18	
Difficion Factor:	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	43	5.7	ng/L
Acenaphthylene	7.6	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a)anthracene	1.0 J	4.3	ng/L
Benzo (b) fluoranthene	1.0 J	4.7	ng/L
Benzo(k) fluoranthene	1.4 J	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	0.96 J	6.2	ng/L
Benzo(a)pyrene	1.0 J	2.5	ng/L
Benzo (e) pyrene	1.0 J	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	1.5 J	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	1.3 J	4.1	ng/L
2,3-Dihydroindene	12	5.0	ng/L
Fluoranthene	3.7 J	4.6	ng/L
Fluorene	13	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	1.6 J	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.4 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.0 J,B	6.3	ng/L
Pyrene	2.9 J	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	33	(30 - 118)	
Fluorene d-10	50	(41 - 162)	
Naphthalene-d8	51	(30 - 108)	

J Estimated result. Result is less than RL.

Note(s):

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: E7-081803

## GC/MS Semivolatiles

Lot-Sample #: D3H190227-007	Work Order #: FWJJW1AA	Matrix WG
Date Sampled: 08/18/03	Date Received: 08/19/03	
00/02/02	Amalueie Date . 09/28/03	

Prep Batch #...: 3234377 Analysis Time..: 21:32

Dilution Factor: 1

Method.....: SW846 8270C SIM

Acenaphthene Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a) anthracene Benzo(b) fluoranthene Benzo(k) fluoranthene 2,3-Benzofuran Benzo(ghi) perylene Benzo(a) pyrene Benzo(b) thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h) anthracene Dibenzofuran Dibenzofuran Dibenzothiophene 2,3-Dihydroindene Fluoranthene Fluorene Indene Indeno(1,2,3-cd) pyrene Indole 2-Methylnaphthalene 1-Methylnaphthalene Perylene Phenanthrene Pyrene Quinoline  SURROGATE Chrysene-d12 Fluorene d-10		REPORTIN	rG
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	7.1	5.7	ng/L
<del>-</del>	ND	4.8	ng/L
-	4.2 J	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	${\tt ng/L}$
Benzo (a) pyrene	ND	2.5	ng/L
= =	ND	4.3	ng/L
	1.5 J	5.2	ng/L
	ND	5.6	ng/L
<del>-</del>	ND	3.8	ng/L
Chrysene	ND	5 <i>.</i> 6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	2.8 J	5.0	ng/L
Fluoranthene	1.0 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	1.8 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
	ND	5.6	ng/L
Naphthalene	2.0 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	1.8 Ј	9.0	ng/L
	PERCENT	RECOVERY	<u>r</u>
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	46	(30 - 11	
Fluorene d-10	46	(41 - 16	•
Naphthalene-d8	57	(30 - 10	08)

#### NOTE(S):

I Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

#### Client Sample ID: E15-081803

## GC/MS Semivolatiles

Lot-Sample #: D3H190227-008	Work Order #: FWJJX1AA	Matrix: WG
Date Sampled: 08/18/03	Date Received: 08/19/03	
Prep Date: 08/22/03	Analysis Date: 09/28/03	
Prep Batch #: 3234377	Analysis Time: 22:09	
Dilution Factor: 1		

Method....: SW846 8270C SIM

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	2.2 J	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	4.8 6.2	_
Anthracene	ND	4.2	ng/L ng/L
Benzo(a) anthracene	ND	4.3	-
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L ng/L
2,3-Benzofuran	ND	5.4	_
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	4.3 5.2	ng/L
Biphenyl	ND ND	5.4	ng/L
Carbazole	ND ND		ng/L
Chrysene	ND	3.8	ng/L
-		5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	1.4 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.8 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
•	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	24 *	(30 - 118)	
Fluorene d-10	42	(41 - 162)	
Naphthalene-d8	60	(30 - 108)	
-		,== == ,	

## NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

# QC DATA ASSOCIATION SUMMARY

D3H190227

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3234377	3234159
002	WG	SW846 8270C SIM		3234377	3234159
003	WG	SW846 8270C SIM		3234377	3234159
004	WG	SW846 8270C SIM		3234377	3234159
005	WG	SW846 8270C SIM		3234377	3234159
006	WG	SW846 8270C SIM		3234377	3234159
007	WG	SW846 8270C SIM		3234377	3234159
008	WG	SW846 8270C SIM		3234377	3234159

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Work Order #...: FWTLF1AA

Client Lot #...: D3H190227

MB Lot-Sample #: D3H220000-377

Prep Date....: 08/22/03

Matrix....: WATER
Analysis Time.:: 16:32

Prep Batch #...: 3234377

Analysis Date..: 09/28/03

Dilution Factor: 1

		REPORTI	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo (b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SWB46 8270C SIM
Benzo(a) pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	ИD	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
Chrysene	ND	5.6	$_{ m ng/L}$	SW846 8270C SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2.3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluoranchene Fluorane	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	NĎ	5.4	ng/L	SW846 8270C SIM
Indele Indole	ИĎ	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	1.2 J	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	1.3 J	6.3	ng/L	SW846 8270C SIM
	ND	4.2	ng/L	SW846 8270C SIM
Pyrene Ouinoline	ND	9.0	ng/L	SW846 8270C SIM
Quinoline			<b>J</b> .	
	PERCENT	RECOVER	RΥ	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	54	(30 - 1)	18)	
Fluorene d-10	29 *	(41 - 1)	L <b>62</b> )	
Naphthalene-d8	41	(30 - 1	LO8)	
Nahittigrene-00	<del></del>	. –		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

(Continued on next page)

# METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H190227 Work Order #...: FWTLF1AA

Matrix....: WATER

# Note(s):

\* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H190227 Work Order #...: FWJH91AC-MS Matrix.....: WG

MS Lot-Sample #: D3H190227-001 FWJH91AD-MSD

 Date Sampled...:
 08/18/03
 Date Received..:
 08/19/03

 Prep Date.....:
 08/22/03
 Analysis Date..:
 09/28/03

 Prep Batch #...:
 3234377
 Analysis Time..:
 18:25

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo(e)pyrene	0.0 a	(30 - 150)			SW846 8270C SIM
	14 a,p	(30 - 150)	200	(0-50)	SW846 8270C SIM
Chrysene	37	(30 - 132)			SW846 8270C SIM
-	55	(30 - 132)	39	(0-50)	SW846 8270C SIM
Fluorene	45	(30 - 132)			SW846 8270C SIM
	47	(30 - 132)	3.4	(0-50)	SW846 8270C SIM
Indene	46	(30 - 150)			SW846 8270C SIM
	<b>6</b> 5	(30 - 150)	34	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	49	(30 - 150)			SW846 8270C SIM
	62	(30 - 150)	24	(0-50)	SW846 8270C SIM
Naphthalene	45	(30 - 150)			SW846 8270C SIM
	58	(30 - 150)	20	(0-50)	SW846 8270C SIM
Quinoline	25 a	(30 - 150)			SW846 8270C SIM
	54 p	(30 - 150)	72	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		30		(30 - 118	<del>)</del>
		55		(30 - 118	)
Fluorene d-10		27 *		(41 - 162	· · · · · · · · · · · · · · · · · · ·
		29 *		(41 - 162	)
Naphthalene-d8		39		(30 - 108	•
_		51		(30 - 108	•

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

- Surrogate recovery is outside stated control limits.
- a Spiked analyte recovery is outside stated control limits.
- p Relative percent difference (RPD) is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H190227 Work Order #...: FWJH91AC-MS Matrix...... WG

MS Lot-Sample #: D3H190227-001 FWJH91AD-MSD

 Date Sampled...:
 08/18/03
 Date Received...:
 08/19/03

 Prep Date.....:
 08/22/03
 Analysis Date...:
 09/28/03

 Prep Batch #...:
 3234377
 Analysis Time...:
 18:25

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo(e)pyrene	ND	7.520	0.0	ng/L	0.0 a		SW846 8270C SIM
	ND	7.51	1.04	ng/L	14 a,p	200	SW846 8270C SIM
Chrysene	ND	7.52	2.79	ng/L	37		SW846 8270C SIM
	ND	7.51	4.13	ng/L	55	39	SW846 8270C SIM
Fluorene	ND	7.52	3.40	ng/L	45		SW846 8270C SIM
	ND	7.51	3.52	ng/L	47	3.4	SW846 8270C SIM
Indene	ND	7.52	3.49	ng/L	46		SW846 8270C SIM
	ND	7.51	4.91	ng/L	65	34	SW846 8270C SIM
2-Methylnaphthalene	ND	7.52	3.66	ng/L	49		SW846 8270C SIM
	ND	7.51	4.66	ng/L	62	24	SW846 8270C SIM
Naphthalene	1.1	7.52	4.46	ng/L	45		SW846 8270C SIM
	1.1	7.51	5.42	ng/L	58	20	SW846 8270C SIM
Quinoline	ND	7.52	1.91	ng/L	25 a		SW846 8270C SIM
	ND	7.51	4.05	ng/L	54 p	72	SW846 8270C SIM

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	30	(30 - 118)
	55	(30 - 118)
Fluorene d-10	27 *	(41 - 162)
	29 *	(41 - 162)
Naphthalene-d8	39	(30 - 108)
	51	(30 - 108)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

<sup>\*</sup> Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

# Chain of Custody Record

Comments

2.8° /3 S



**STL Deriver** 4955 Yarrow Street Arvada, CO 80002

STL-4124 (0901) Chain of Custody Number 289203 Anderson Telephone Number (Area Code)/Fax Number 952 924 255 7 Page Site Contact Analysis (Attach list if Brian String more space is needed) Carrier/Waybill Number Special Instructions/ Contract/Purchase Order/Quote No. Conditions of Receipt Containers & Matrix **Preservatives** Sample I.D. No. and Description H2S04 Date Time ğ (Containers for each sample may be combined on one line) -081803 1145 6 1150 Possible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained Non-Hazard ☐ Flammable Skin Irritant Poison 8 Unknown Return To Client Archive For Disposal By Lab longer than 1 month) Months Turn Around Time Required QC Requirements (Specify) ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days 24 Hours Other 1. Relinquiefied By 1600) 1. Received By 2. Relinguished B 2. Received By 3. Relinquished By 3. Received By



2.6 M



**STL Deriver** 4955 Yarrow Street Arvada, CO 80002

STL-4124 (0901) Project Manager 500 Inderson Telephone Number (Area Code)/Fax Number Site Contact Analysis (Attach list if more space is needed) and Location (State) Carrier/Waybill Number Special Instructions/ Contract/Purchase Order/Quote No. Conditions of Receipt Containers & Matrix Preservatives Sample I.D. No. and Description H2S04 Date Time Ş (Containers for each sample may be combined on one line) E3MS-081803 1155 6 MSD -081803 200 Possible Hazard Identification Sample Disposal (A fee may be assessed if samples are retained Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Return To Client Disposal By Lab Archive For \_ longer than 1 month) Turn Around Time Required QC Requirements (Specify) 24 Hours 48 Hours 7 Days 14 Days 21 Days 1. Relinquished 6 Time 1. Received By 2. Relinquished By Time 3. Relinquished By Date Time 3. Received By Comments

# Chain of Custody Record

3.2° NB 8/19/03



**STL Deriver** 4955 Yarrow Street Arvada, CO 80002

STL-4124 (0901)																										
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3. Relinquished By		Date	-	177	me		3.	Recei	ved E	ly											Da	te		Time		
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STL-4124 (0901)																			•							
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Contract/Purchase @rder/Quote No.				Ма	ıtrix	_		P	Cont Prese	aine erval	rs & ives	;	404										Condit	ons	of Rece	ipt
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# Chain of Custody Record





# Services Severn Trent Laboratories, Inc.

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DISTRIBUTION: WHITE - Returned to Client with Report: CANARY - Stays with the Sample; PINK - Field Copy



#### **DATA QUALITY ASSESSMENT**

STL Project # D3H190227 (R)

March 4, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### **SUMMARY**

A data assessment was performed on the data for the analyses of eight aqueous samples for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on August 18, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H190227.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### SAMPLES

The samples included in this review are listed below:

E3-081803

E3D-081803

E3FB-081803

E3FBD-081803

E2-081803

E13-081803

E7-081803

E15-081803

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results



- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.1°C and 3.2°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, prep batch 3234377. Naphthalene and Phenanthrene were detected in the method blank. Target analytes were also detected in the duplicate field blank sample. The analytical results for this data package were flagged by the laboratory due to the method blank contamination.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were low in four of the seven samples for fluorene-d10 and in one sample for chrysene-d12. Fluorene-d10 was also low in the Method Blank and MS/MSD. All other surrogates were in control of the QAPP limits.

#### **LCS Results**

The LCS could not be analyzed due to a cracked vial at the laboratory. The sample had evaporated. The client was notified.

#### **MS/MSD Resuits**

MS/MSD analyses were performed on sample E3-081203. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for benzo(e)pyrene was 0% for the MS and 14% for the MSD. The RPDs was outside of the acceptable range for this compound (200). Quinoline had lower recoveries in the MS. The MSD for quinoline was higher (54%), thus causing the RPD to outside of the control limits. All other recoveries and RPDs were within the acceptable range.



Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	0/14	200	30-150/0-50
Quinoline	25/ok	72	30-150/0-50

#### **Field Duplicate Results**

Sample E3-081803 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for the detected analyte. Only one out of 31 compounds was detected with a RPD range of 9.5%.

#### **Quantitation Limits and Sample Results**

There were no samples analyzed using a dilution.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.



## ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H200258

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Gail DeRuzzo Project Manager

October 6, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables (The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary - Detection Highlights</li> <li>Methods Summary</li> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> <li>Analytical Results</li> <li>QC Data Association Summary</li> <li>Chain-of-Custody</li> </ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
• General Chemistry	
Subcontracted Data	

# CASE NARRATIVE D3H200258

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

#### Sample Receiving

Nine samples were received under chain of custody on August 20, 2003. The samples were received in good condition at temperatures of 2.8, 3.0, 2.3, 2.2, 3.4, and 3.2°C.

#### GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The surrogate recovery of Fluorene-d10 was below the 30% threshold for samples D3H200258-001, 006, and the MS of sample 003. The surrogate recovery of Chrysene-d12 was below the 30% threshold for samples D3H200258-001, 003, 004, 008, 009, and the MS of sample 003.

The internal standard Perylene-d12 was outside control limits in sample D3H200258-009. Matrix effects were obvious; the chromatogram reveals background interference.

The analytes Benzo(a)anthracene, Chyrsene, Fluoranthene, Phenanthrene, and Pyrene were detected in the Method Blank for QC batch 3236096 below the project-specific reporting limits. Associated sample results are flagged "B".

The analyte Naphthalene was detected in the Method Blank for QC batch 3237670 below the project-specific reporting limits. Associated sample results are flagged "B".

The Laboratory Control Sample recovery for Quinoline was below the lower control limit for QC batches 3236096 and 3237670. Quinoline historically performs poorly and it was recovered within control limits in the MS/MSD in QC batch 3236096. No sample volume remains for reextractions.

The MS/MSD performed on sample D3H200258-003 demonstrated recoveries that were below the control limits for Benzo(e)pyrene, Chrysene, and Fluorene. In addition the relative percent difference (RPD) was outside control limits for Chrysene and Quinoline.

The method required MS/MSD could not be performed for QC batch 3237670 due to insufficient sample volume.

Detections in the Field Blank and Field Blank Duplicate (FBD) are less than the reporting limit except Dibenzothiophene in the FBD.

No other anomalies were observed.

# **Data Completeness for Method 8270C SIM**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETE		JLATION				
LOT: D3H200258						
ANALYSIS:	SW846-8270C SIM					
QC Parameter	Data Planned	Valid Data Obtained				
Method Blank	62	56				
MB Surrogates	6	6				
LCS	14	12				
LCS Surrogates	6	6				
FB/FBD	62	61				
MS	7	4				
MS Surrogates	3	1				
MSD	7	6				
MSD Surrogates	3	3				
MS/MSD RPD	7	5				
Sample/Dup. RPD	31	31				
Sample Surrogates	27	20				
Samples and QC Internal Standard Area	45	44				
TOTAL	280	250				
% Completeness	91.1%					

<sup>\*</sup>A MS/MSD was performed on sample SLP6 08-19-03.

# Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD		T	1		
LOT D3H200258	Ţ		<u> </u>		
Sample: SLP6 08-19-03	+	DUP: SLP6D 08-19-03			
Compound	Res ult	Compound	Result	RPD	RPD>50%
Acenaphthene	60	Acenaphthene	48	22.2	
Acenaphthylene	10	Acenaphthylene	9.9	1.0	
Acridine	4.9	Acridine	ND	NC	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	1.2	Benzo(b)fluoranthene	ND	NC	
Benzo(k)fluoranthene	1.2	Benzo(k)fluoranthene	ND	NC	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	2.4	Benzo(b)thiophene	1.9	23.3	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	1.5	Carbazole	1.4	6.9	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	0.98	Dibenzofuran	ND	NC	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	48	2,3-Dihydroindene	41	15.7	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	3.7	Fluorene	3.0	20.9	
Indene	2.2	Indene	2.0	9.5	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	ND	Indole	ND	0.0	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	2.3	Naphthalene	2.0	14.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	1.0	Phenanthrene	1.1	9.5	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	2.7	NC	

RPD = Relative Percent Difference
ND = Compound not detected in the sample
p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3H200258

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
SLP11 08-19-03 08/19/03 08:55 001				
DELII 00 15 05 00,15,05 00.55 001				
Benzo(a)anthracene	5.4 B	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	9.5	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	9.5	4.1	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	3.8 J	6.2	ng/L	SW846 8270C SIM
Benzo(a) pyrene	5.4	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	4.0 J	4.3	ng/L	SW846 8270C SIM
Carbazole	1.4 J	3.8	ng/L	SW846 8270C SIM
Chrysene	8.1 B	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	1.1 J	5.9	ng/L	SW846 8270C SIM
2,3-Dihydroindene	1.3 J	5.0	ng/L	SW846 8270C SIM
Fluoranthene	11 B	4.6	ng/L	SW846 8270C SIM
Indene	1.7 J	4.7	ng/L	SW846 8270C SIM
<pre>Indeno(1,2,3-cd)pyrene</pre>	2.9 J	5.4	ng/L	SW846 8270C SIM
Naphthalene	4.3 J	8.6	ng/L	SW846 8270C SIM
Perylene	1.9 J	3.3	ng/L	SW846 8270C SIM
Phenanthrene	1.5 J,B	6.3	ng/L	SW846 8270C SIM
Pyrene	10 B	4.2	ng/L	SW846 8270C SIM
SLP6 08-19-03 08/19/03 10:15 003				
			4-	
Acenaphthene	60	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	10	4.8	ng/L	SW846 8270C SIM
Acridine	4.9 J	6.2	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	1.2 J	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	1.2 J	4.1	ng/L	SW846 8270C SIM
Benzo(b)thiophene	2.4 J	5.2	ng/L	SW846 8270C SIM
Carbazole	1.5 J	3.8	ng/L	SW846 8270C SIM
Dibenzofuran	0.98 J	5.7	ng/L	SW846 8270C SIM
2,3-Dihydroindene	48	5.0	ng/L	SW846 8270C SIM
Fluorene	3.7 J	4.1	ng/L	SW846 8270C SIM
Indene	2.2 Ј	4.7	ng/L	SW846 8270C SIM
Naphthalene	2.3 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	1.0 J,B	6.3	ng/L	SW846 8270C SIM
SLP6D 08-19-03 08/19/03 10:20 004				
Acenaphthene	48	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	9.9	4.8	ng/L	SW846 8270C SIM
Benzo(b) thiophene	1.9 J	5.2	ng/L	SW846 8270C SIM
Carbazole	1.4 J	3.8	ng/L	SW846 8270C SIM
2,3-Dihydroindene	41	5.0	ng/L	SW846 8270C SIM
Fluorene	3.0 J	4.1	ng/L	SW846 8270C SIM
Indene	2.0 J	4.7	ng/L	SW846 8270C SIM

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3H200258

		REPORTING		ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
SLP6D 08-19-03 08/19/03 10:20 004				
Naphthalene	2.0 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	1.1 J,B	6.3	ng/L	SW846 8270C SIM
Ouinoline	2.7 J	9.0	ng/L	SW846 8270C SIM
Quinorine	2.7 0	9.0	ng/ b	SWO40 0270C BIN
SLP12 08-19-03 08/19/03 10:45 005				
Naphthalene	1.8 J	8.6	ng/L	SW846 8270C SIM
SLP12FB 08-19-03 08/19/03 10:50 00	6			
Naphthalene	1.2 J	8.6	ng/L	SW846 8270C SIM
SLP12FBD 08-19-03 08/19/03 10:55 0	07			
Acridine	5.7 J	6.2	ng/L	SW846 8270C SIM
Anthracene	1.0 J	4.2	ng/L	SW846 8270C SIM
Dibenzothiophene	9.6	4.1	ng/L	SW846 8270C SIM
Indole	2.6 J	4.7	ng/L	SW846 8270C SIM
Naphthalene	1.1 J	8.6	ng/L	SW846 8270C SIM
W401-081903 08/19/03 09:10 008				
Acenaphthene	29	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	2.0 J	4.8	ng/L	SW846 8270C SIM
Acridine	3.5 J	6.2	ng/L	SW846 8270C SIM
Anthracene	1.0 J	4.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	1.2 J	5.2	ng/L	SW846 8270C SIM
2,3-Dihydroindene	3.1 J	5.0	ng/L	SW846 8270C SIM
Fluoranthene	8.7 B	4.6	ng/L	SW846 8270C SIM
Indene	1.0 Ј	4.7	ng/L	SW846 8270C SIM
Indole	3.9 J	4.7	ng/L	SW846 8270C SIM
Naphthalene	1.8 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	1.5 J,B	6.3	ng/L	SW846 8270C SIM
Pyrene	7.2 B	4.2	ng/L	SW846 8270C SIM
W48-081903 08/19/03 10:30 009			·	
Acenaphthene	62	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	1.7 J	4.8	ng/L	SW846 8270C SIM
Acridine	12	6.2	ng/L	SW846 8270C SIM
Anthracene	3.7 J	4.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	6.3	5.2	ng/L	SW846 8270C SIM
Carbazole	1.9 J	3.8	ng/L	SW846 8270C SIM

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3H200258

PARAMETER	RESULT LIMIT		UNITS	ANALYTICAL METHOD	
W48-081903 08/19/03 10:30 009					
Dibenzofuran	1.2 J	5.7	ng/L	SW846 8270C SIM	
Dibenzothiophene	2.8 J	4.1	ng/L	SW846 8270C SIM	
2,3-Dihydroindene	10	5.0	ng/L	SW846 8270C SIM	
Fluoranthene	1.5 J	4.6	ng/L	SW846 8270C SIM	
Fluorene	3.9 J	4.1	ng/L	SW846 8270C SIM	
Indene	14	4.7	ng/L	SW846 8270C SIM	
Indole	3.4 J	4.7	ng/L	SW846 8270C SIM	
2-Methylnaphthalene	1.6 J	5.9	ng/L	SW846 8270C SIM	
1-Methylnaphthalene	2.1 J	5.6	ng/L	SW846 8270C SIM	
Naphthalene	3.9 J,B	8.6	ng/L	SW846 8270C SIM	
Phenanthrene	1.3 J	6.3	ng/L	SW846 8270C SIM	
Pyrene	2.8 J	4.2	ng/L	SW846 8270C SIM	
Quinoline	1.9 J	9.0	ng/L	SW846 8270C SIM	

# **METHODS SUMMARY**

#### D3H200258

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

Base/Neutrals and Acids SW846 8270C SIM SW846 3520C

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

#### D3H200258

ANALYTICAL METHOD	ANALYST	ANALYST ID
SW846 8270C SIM	Tim O'Donnell	000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

#### D3H200258

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FWL4X	001	SLP11 08-19-03	08/19/03	08:55
FWL43	002	SLP13 08-19-03	08/19/03	09:10
FWL47	003	SLP6 08-19-03	08/19/03	10:15
FWL5L	004	SLP6D 08-19-03	08/19/03	10:20
FWL5M	005	SLP12 08-19-03	08/19/03	10:45
FWL5N	006	SLP12FB 08-19-03	08/19/03	10:50
FWL57	007	SLP12FBD 08-19-03	08/19/03	10:55
FWL6C	00B	W401-081903	08/19/03	09:10
FWL6K	009	W48-081903	08/19/03	10:30

#### NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: SLP11 08-19-03

# GC/MS Semivolatiles

Lot-Sample #: D3H200258-001 Date Sampled: 08/19/03 Prep Date: 08/24/03 Prep Batch #: 3236096 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/20/03 09/28/03 22:47	Matrix: WG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	5.4 B	4.3	ng/L
Benzo(b) fluoranthene	9.5	4.7	ng/L
Benzo(k) fluoranthene	9.5	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	3.8 J	6.2	ng/L
Benzo(a)pyrene	5.4	2.5	ng/L
Benzo(e)pyrene	4.0 J	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	1.4 J	3.8	ng/L
Chrysene	8.1 B	5.6	ng/L
Dibenzo (a, h) anthracene	1.1 J	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND .	4.1	ng/L
2,3-Dihydroindene	1.3 J	5.0	ng/L
Fluoranthene	11 B	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	1.7 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	2.9 J	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	4.3/J	8.6	ng/L
Perylene	1.9 J	3.3	ng/L
Phenanthrene	1.5 J,B	6.3	ng/L
Pyrene	10 B	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	21 *	(30 - 118)	•
Fluorene d-10	23 *	(41 - 162)	
Naphthalene-d8	30	(30 - 108)	

NOTE (S):

\* Surrogate recovery is outside stated control limits.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated result. Result is less than RL.

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## Client Sample ID: SLP13 08-19-03

#### GC/MS Semivolatiles

Lot-Sample #:	D3H200258-002	Work Order #:	FWL431AA	Matrix:	WG

 Date Sampled...:
 08/19/03
 Date Received..:
 08/20/03

 Prep Date....:
 08/24/03
 Analysis Date..:
 09/28/03

 Prep Batch #...:
 3236096
 Analysis Time..:
 23:25

Dilution Factor: 1

		REPORTIN	īG
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND .	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	42	(30 - 11	
Fluorene d-10	31 *	(41 - 16	2)
Naphthalene-d8	45	(30 - 10	8)

NOTE(S):

Surrogate recovery is outside stated control limits.

## Client Sample ID: SLP6 08-19-03

## GC/MS Semivolatiles

Lot-Sample #: D3H200258-003	Work Order #:	FWI.477AA	Matrix: WG
Date Sampled: 08/19/03	Date Received:		PAZELIA
Prep Date: 08/24/03	Analysis Date:		
_			
Prep Batch #: 3236096	Analysis Time:	00:03	
Dilution Factor: 1		G110 4 6 A 0 = 4	4 4-1
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	60	5.7	ng/L
Acenaphthylene	10	4.8	ng/L
Acridine	4.9 J	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	1.2 J	4.7	ng/L
Benzo(k) fluoranthene	1.2 J	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	${ m ng/L}$
Benzo(b) thiophene	2.4 J	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	1.5 J	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	0.98 J	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	48	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	3.7 J	4.1	ng/L
Indene	2.2 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	2.3 J	8.6	nq/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.0 J,B	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	DECOMENY	
SURROGATE		RECOVERY	
	RECOVERY 29 *	LIMITS	
Chrysene-d12 Fluorene d-10	<del>_</del> -	(30 - 118)	
riuorene d-10	34 *	(41 - 162)	

## NOTE(S):

Naphthalene-d8

48

(30 - 108)

<sup>•</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

#### Client Sample ID: SLP6D 08-19-03

## GC/MS Semivolatiles

Lot-Sample #: D3H200258-004	Work Order #: FWL5L1AA	Matrix WG
Date Sampled: 08/19/03	Date Received: 08/20/03	
Prep Date: 08/24/03	Analysis Date: 09/29/03	
Prep Batch #: 3236096	Analysis Time: 01:57	

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
cenaphthene	48	5.7	ng/L
cenaphthylene	9.9	4.8	ng/L
cridine	ND	6.2	ng/L
nthracene	ND	4.2	ng/L
enzo(a)anthracene	ND	4.3	ng/L
Benzo(b)fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Senzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	1.9 J	5.2	ng/L
Siphenyl	ND	5.6	ng/L
Carbazole	1.4 J	3.8	ng/L
Chrysene	ND	5.6	ng/L
ibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
ibenzothiophene	ND	4.1	ng/L
,3-Dihydroindene	41	5.0	ng/L
luoranthene	ND	4.6	ng/L
luorene	3.0 J	4.1	ng/L
indene	2.0 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
Methylnaphthalene	ND	5.6	ng/L
aphthalene	2.0 J	8.6	ng/L
erylene	ND	3.3	ng/L
henanthrene	1.1 J,B	6.3	ng/L
Pyrene	ND	4.2	ng/L
uinoline	2.7 Ј	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	25 *	(30 - 118	<u> </u>
Fluorene d-10	30 *	(41 - 162	
Naphthalene-d8	46	(30 - 108	=

#### NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: SLP12 08-19-03

## GC/MS Semivolatiles

Lot-Sample #: D3H200258-005	Work Order #: F	WL5M1AA	Matrix:	WG
Date Sampled: 08/19/03	Date Received: 0	08/20/03		
Prep Date: 08/24/03	Analysis Date: 0	09/29/03		
Prep Batch #: 3236096	Analysis Time: 0	02:35		
Dilution Factor: 1				
	Method: S	SW846 8270C SIM	I	

		REPORTING	<b>,</b>
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	<u> </u>	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.8 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	42	(30 - 118)	_ )
Fluorene d-10	30 *	(41 - 162)	
Naphthalene-d8	52	(30 - 108)	•

## Note(s):

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: SLP12FB 08-19-03

## GC/MS Semivolatiles

Lot-Sample #: D3H200258-006	Work Order #:	FWL5N1AA	Matrix WG
Date Sampled: 08/19/03	Date Received:	08/20/03	
Prep Date: 08/24/03	Analysis Date:	09/29/03	
Prep Batch #: 3236096	Analysis Time:	03:12	
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ИD	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a)anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND ·	4.1	${\tt ng/L}$
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.2 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
			_
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	81	(30 - 118)	-
Fluorene d-10	27 *	(41 - 162)	

41

(30 - 108)

#### NOTE (S)

Naphthalene-d8

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

#### Client Sample ID: SLP12FBD 08-19-03

#### GC/MS Semivolatiles

Matrix..... WG

Lot-Sample #...: D3H200258-007 Work Order #...: FWL571AA

LOC-Sample #: D3H2U0258-UU/	work Order #:	LMT2/TWW	Matrix wo
Date Sampled: 08/19/03	Date Received:	08/20/03	
Prep Date: 08/24/03	Analysis Date:	09/27/03	
Prep Batch #: 3236096	Analysis Time:	05:14	
Dilution Factor: 1			
	Method:	SW846 8270	OC SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	5.7 J	6.2	ng/L
Anthracene	1.0 J	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k)fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	9.6	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	2.6 J	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
V			J.

8.6

3.3

6.3

4.2

9.0

ng/L

ng/L

ng/L

ng/L

ng/L

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	70	(30 - 118)
Fluorene d-10	34 *	(41 - 162)
Naphthalene-d8	40	(30 - 108)

1.1 J

ND

ND

ND

ND

#### NOTE(S):

Naphthalene

Phenanthrene

Perylene

Quinoline

Pyrene

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

#### Client Sample ID: W401-081903

#### GC/MS Semivolatiles

Method....: SW846 8270C SIM

Lot-Sample #: D3H200258-008 Date Sampled: 08/19/03	Work Order #: FWL6C1AA Date Received: 08/20/03	Matrix WG
Prep Date: 08/24/03	<b>Analysis Date:</b> 09/29/03	
Prep Batch #: 3236096	Analysis Time: 19:34	
Dilution Factor: 1		

REPORTING RESULT PARAMETER LIMIT UNITS Acenaphthene 29 5.7 ng/L 2.0 J Acenaphthylene 4.8 ng/L 3.5 J Acridine 6.2 ng/L **Anthracene** 1.0 J 4.2 ng/L 4.3 Benzo (a) anthracene ND ng/L Benzo (b) fluoranthene 4.7 ND ng/L Benzo(k) fluoranthene 4.1 ND ng/L 2,3-Benzofuran ND 5.4 ng/L Benzo(ghi)perylene ND 6.2 ng/L ND 2.5 Benzo(a)pyrene ng/L Benzo(@)pyrene ND 4.3 ng/L Benzo (b) thiophene 1.2 J 5.2 ng/L Biphenyl ND 5.6 ng/L Carbazole ND 3.8 nq/L Chrysene ND 5.6 ng/L Dibenzo (a, h) anthracene ND 5.9 ng/L Dibenzofuran ND 5.7 nq/L Dibenzothiophene ND 4.1 ng/L 2,3-Dihydroindene 3.1 J 5.0 ng/L **Fluoranthene** 8.7 B 4.6 nq/L Fluorene ND 4.1 ng/L Indene 1.0 J 4.7 ng/L Indeno (1, 2, 3-cd) pyrene ND 5.4 ng/L 3.9 J 4.7 Indole ng/L 2-Methylnaphthalene ND 5.9 ng/L 1-Methylnaphthalene ND 5.6 ng/L Naphthalene 1.8 J 8.6 ng/L Perylene ND 3.3 ng/L Phenanthrene 1.5 J,B 6.3 ng/L 7.2 B Pyrene 4.2 ng/L Quinoline ND 9.0 ng/L PERCENT RECOVERY SURROGATE RECOVERY LIMITS Chrysene-d12 23 \* (30 - 118)Fluorene d-10 59 (41 - 162)Naphthalene-d8 55 (30 - 108)

#### NOTE(S):

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

# Client Sample ID: W48-081903

## GC/MS Semivolatiles

Lot-Sample #: D3H200258-009 Date Sampled: 08/19/03 Prep Date: 08/25/03 Prep Batch #: 3237670 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/20/03 10/01/03	Matrix WG
	Method:	SW846 8270	C SIM
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	62	5.7	ng/L
Acenaphthylene	1.7 J	4.8	ng/L
Acridine	12	6.2	ng/L
Anthracene	3.7 J	4.2	ng/L
Benzo(a)anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	6.3	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	1.9 J	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	1.2 J	5.7	ng/L
Dibenzothiophene	2.8 J	4.1	ng/L
2,3-Dihydroindene	10	5.0	ng/L
Fluoranthene	1.5 J	4.6	ng/L
Fluorene	3.9 J	4.1	ng/L
Indene	14	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	3.4 J	4.7	ng/L
2-Methylnaphthalene	1.6 J	5.9	ng/L
1-Methylnaphthalene	2.1 J	5.6	ng/L
Naphthalene	3.9 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.3 J	6.3	ng/L
Pyrene	2.8 J	4.2	ng/L
Quinoline	1.9 J	9.0	ng/L
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Chrysene-d12	14 *	(30 - 118)	
Fluorene d-10	98	(41 - 162)	
Naphthalene-d8	49	(30 - 108)	

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

# QC DATA ASSOCIATION SUMMARY

D3H200258

# Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3236096	3236052
002	WG	SW846 8270C SIM		3236096	3236052
003	WG	SW846 8270C SIM		3236096	3236052
004	WG	SW846 8270C SIM		3236096	3236052
005	WG	SW846 8270C SIM		3236096	3236052
006	WG	SW846 8270C SIM		3236096	3236052
007	WG	SW846 8270C SIM		3236096	3236052
008	WG	SW846 8270C SIM		3236096	3236052
009	WG	SW846 8270C SIM		3237670	

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FWXL21AA Matrix...... WATER

MB Lot-Sample #: D3H240000-096

Prep Date....: 08/24/03 Analysis Time.:: 17:10

Dilution Factor: 1

		REPORTI		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo (a) anthracene	2.6 J	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	${\tt ng/L}$	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo(a)pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b)thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
Chrysene	1.8 J	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	2.9 J	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	2.0 Ј	6.3	ng/L	SW846 8270C SIM
Pyrene	2.2 J	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY	7	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	53	(30 - 11	.8)	
Fluorene d-10	30 *	(41 - 16	(2)	
Naphthalene-d8	37	(30 - 10	8)	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

(Continued on next page)

# METHOD BLANK REPORT

# GC/MS Semivolatiles

Client Lot #...: D3H200258

Work Order #...: FWXL21AA

Matrix....: WATER

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

#### METHOD BLANK REPORT

## GC/MS Semivolatiles

Work Order #...: FW09G1AA Matrix..... WATER Client Lot #...: D3H200258

MB Lot-Sample #: D3H250000-670 Analysis Time..: 20:21

**Prep Date....:** 08/25/03

Prep Batch #...: 3237670 Analysis Date..: 10/01/03

Dilution Factor: 1

		REPORTI	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo(a)anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo(a)pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b)thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	ng/L	SW846 8270C SIM
Chrysene	ND	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5. <b>7</b>	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	1.1 J	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY	7	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	61	(30 - 11	L8)	
Fluorene d-10	44	(41 - 16	52)	
Naphthalene-d8	59	(30 - 10	8)	

	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	61	(30 - 118)		
Fluorene d-10	44	(41 - 162)		
Naphthalene-d8	59	(30 - 108)		

## NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

J Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

# GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FWXL21AC Matrix.....: WATER

LCS Lot-Sample#: D3H240000-096

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	63	(30 - 150)	SW846 8270C SIM
Chrysene	59	(30 - 132)	SW846 8270C SIM
Fluorene	62	(30 - 132)	SW846 8270C SIM
Indene	52	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	55	(30 - 150)	SW846 8270C SIM
Naphthalene	59	(30 - 150)	SW846 8270C SIM
Quinoline	0.0 a	(30 - 150)	SW846 8270C SIM

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	69	(30 - 118)
Fluorene d-10	47	(41 - 162)
Naphthalene-d8	55	(30 - 108)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### LABORATORY CONTROL SAMPLE DATA REPORT

### GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FWXL21AC Matrix...... WATER

LCS Lot-Sample#: D3H240000-096

 Prep Date....:
 08/24/03
 Analysis Date..:
 09/26/03

 Prep Batch #...:
 3236096
 Analysis Time..:
 17:17

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo(e)pyrene	10.0	6.35	ng/L	63	SW846 8270C S
Chrysene	10.0	5.88	ng/L	5 <b>9</b>	SW846 8270C S
Fluorene	10.0	6.19	ng/L	62	SW846 8270C S
Indene	10.0	5.22	ng/L	52	SW846 8270C S
2-Methylnaphthalene	10.0	5.46	ng/L	55	SW846 8270C S
Naphthalene	10.0	5.92	ng/L	<b>59</b>	SW846 8270C S
Quinoline	10.0	0.0 a	ng/L	0.0	SW846 8270C S

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	69	(30 - 118)
Fluorene d-10	47	(41 - 162)
Naphthalene-d8	55	(30 - 108)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

### LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FW09G1AC Matrix..... WATER

LCS Lot-Sample#: D3H250000-670

 Prep Date.....:
 08/25/03
 Analysis Date..:
 09/29/03

 Prep Batch #...:
 3237670
 Analysis Time..:
 17:04

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	61	(30 - 150)	SW846 8270C SIM
Chrysene	42	(30 - 132)	SW846 8270C SIM
Fluorene	49	(30 - 132)	SW846 8270C SIM
Indene	50	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	51	(30 - 150)	SW846 8270C SIM
Naphthalene	62	(30 - 150)	SW846 8270C SIM
Quinoline	0.0 a	(30 - 150)	SW846 8270C SIM

·	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-dl2	55	(30 - 118)
Fluorene d-10	38 *	(41 - 162)
Naphthalene-d8	52	(30 - 108)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

- Surrogate recovery is outside stated control limits.
- a Spiked analyte recovery is outside stated control limits.

### LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FW09GlAC Matrix.....: WATER

LCS Lot-Sample#: D3H250000-670

 Prep Date.....:
 08/25/03
 Analysis Date..:
 09/29/03

 Prep Batch #...:
 3237670
 Analysis Time..:
 17:04

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo(e)pyrene	10.0	6.09	ng/L	61	SW846 8270C S
Chrysene	10.0	4.20	ng/L	42	SW846 8270C S
Fluorene	10.0	4.94	ng/L	49	SW846 8270C S
Indene	10.0	5.04	ng/L	50	SW846 8270C S
2-Methylnaphthalene	10.0	5.10	ng/L	51	SW846 8270C S
Naphthalene	10.0	6.23	ng/L	62	SW846 8270C S
Quinoline	10.0	0.0 a	ng/L	0.0	SW846 8270C S

	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-dl2	55	(30 - 118)		
Fluorene d-10	38 *	(41 - 162)		
Naphthalene-d8	52	(30 - 108)		

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

- \* Surrogate recovery is outside stated control limits.
- a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FWL471AC-MS Matrix.....: WG

MS Lot-Sample #: D3H200258-003 FWL471AD-MSD

 Date Sampled...:
 08/19/03
 Date Received..:
 08/20/03

 Prep Date.....:
 08/24/03
 Analysis Date..:
 09/29/03

 Prep Batch #...:
 3236096
 Analysis Time..:
 00:41

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo(e)pyrene	0.0 a	(30 - 150)			SW846 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
Chrysene	22 a	(30 - 132)			SW846 8270C SIM
	49 p	(30 - 132)	79	(0-50)	SW846 8270C SIM
Fluorene	20 a	(30 - 132)			SW846 8270C SIM
	34	(30 - 132)	20	(0-50)	SW846 8270C SIM
Indene	46	(30 - 150)			SW846 8270C SIM
	45	(30 - 150)	1.2	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	54	(30 - 150)			SW846 8270C SIM
	53	(30 - 150)	3.1	(0-50)	SW846 8270C SIM
Naphthalene	45	(30 - 150)			SW846 8270C SIM
	39	(30 - 150)	6.0	(0-50)	SW846 8270C SIM
Quinoline	77	(30 - 150)			SW846 8270C SIM
	36 p	(30 - 150)	68	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		21 *		(30 - 118	<del>)</del>
		46		(30 - 118	}
Fluorene d-10		28 *		(41 - 162	)
		35 *		(41 - 162	)
Naphthalene-d8		44		(30 - 108	)
		38		(30 - 108	)

### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H200258 Work Order #...: FWL471AC-MS Matrix.....: WG

MS Lot-Sample #: D3H200258-003 FWL471AD-MSD

 Date Sampled...:
 08/19/03
 Date Received..:
 08/20/03

 Prep Date.....:
 08/24/03
 Analysis Date..:
 09/29/03

 Prep Batch #...:
 3236096
 Analysis Time..:
 00:41

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo (e) pyrene	ND	7.18	0.0	ng/L	0.0 a		SW846 8270C SIM
	ND	7.49	0.0	ng/L	0.0 a	0.0	SW846 8270C SIM
Chrysene	ND	7.18	1.60	ng/L	22 a		SW846 8270C SIM
	ND	7.49	3.68	ng/L	49 p	79	SW846 8270C SIM
Fluorene	3.7	7.18	5.15	ng/L	20 a		SW846 8270C SIM
	3.7	7.49	6.30	ng/L	34	20	SW846 8270C SIM
Indene	2.2	7.18	5.49	ng/L	46		SW846 8270C SIM
	2.2	7.49	5.55	ng/L	45	1.2	SW846 8270C SIM
2-Methylnaphthalene	ND	7.18	3.87	ng/L	54		SW846 8270C SIM
	ND	7.49	3.99	ng/L	53	3.1	SW846 8270C SIM
Naphthalene	2.3	7.18	5.51	ng/L	45		SW846 8270C SIM
	2.3	7.49	5.20	ng/L	39	6.0	SW846 8270C SIM
Quinoline	ND	7.18	5.55	ng/L	77		SW846 8270C SIM
	ND	7.49	2.73	ng/L	36 p	68	SW846 8270C SIM

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	21 *	(30 - 118)
	46	(30 - 118)
Fluorene d-10	28 *	(41 - 162)
•	35 *	(41 - 162)
Naphthalene-d8	44	(30 - 108)
	38	(30 - 108)

### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

# Chain of Custody Record

2.8, 3,0, 2.3, 3.4,5.2



SERVICES Severn Trent Laboratories, Inc.

STL-4124 (0901)		1 = 117.		<del></del>							<del></del>	<del>.,</del> .	,			<del> </del>
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SLP 11 08-19-03	08-19-03 0		X		6				X						DAH	
SLP 13 08-19-03	08-19-03 0	1							X						1/10	~
SLP6 08-19-03	B-19-03 10		111					$\perp$	X		11	_			1 \ \ \ \ \	11-5)
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DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample, PINK - Field Copy

# Chain of Custody Record



Severn Trent Laboratories, Inc.

STL-4124 (0901)																			
City of St. Louis Pa	ark	Project Ma	nager OTT	7 1	-	50-					8/19/03			03		Cha	ain of Custody 15		1
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Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time ₹	Aquebus	Soi!	Unpres.	HZSO4	H KO3	NaOH	ZnAci NaOH	1/4									
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DISTRIBUTION: WHITE - Returned to Client with Report	CANARY - Stave	with the Samole	PINK -	Field Con															



## **DATA QUALITY ASSESSMENT**

STL Project # D3H200258 (S)

March 4, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

### **SUMMARY**

A data assessment was performed on the data for the analyses of nine aqueous samples for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on August 19, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H200258.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

SLP11-081903

SLP13-081903

SLP6-081903

SLP6D-081903

SLP12-081903

SLP12FB-081903

SLP12FBD-081903

W401-081903

W48-081903

## **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results



- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

## **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

## **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.2°C and 3.4°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, prep batch 3236096. There were five compounds detected in the method blank. Benzo(a)anthracene, chrysene, fluoranthene, pyrene, and phenanthrene were all detected in the method blank. Target analytes were also detected in the field blank samples submitted with this data package. The analytical results for this data package were flagged by the laboratory due to the method blank contamination.

### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were low in seven of the nine samples for fluorene-d10 and in five samples for chrysene-d12. Fluorene-d10 was also low in the LCS and MS/MSD. All other surrogates were in control of the QAPP limits.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses except for quinoline. Quinoline was not recovered in either of the two LCS samples run.

### MS/MSD Results

MS/MSD analyses were performed on sample SLP6-081903. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for benzo(e)pyrene was 0% for the MS and MSD. Chrysene, Fluorene, and Quinoline had lower recoveries to report in the MS and MSD. RPDs for some of the compounds were also out of control. All other recoveries and RPDs were within the acceptable range.



Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	0/10	ok	30-150/0-50
Chrysene	22/ok	79	30-132/0-50
Fluorene	20/ok	ok	30-132/0-50
Quinoline	ok/ok	68	30-150/0-50

## **Field Duplicate Results**

Sample SLP6-081903 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for the detected analytes. A total of 14 out of 31 compounds was detected with a RPD range of 1.0% to 23.3%.

# **Quantitation Limits and Sample Results**

There were no samples analyzed using a dilution.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

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## ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3H260172

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Gail DeRuzzo Project Manager

October 6, 2003

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# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
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<ul> <li>Table of Contents</li> <li>Case Narrative</li> </ul>	
<ul> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> </ul>	
<ul> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> </ul>	
Analytical Results	
<ul><li>QC Data Association Summary</li><li>Chain-of-Custody</li></ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
• Subcontracted Data	

# CASE NARRATIVE D3H260172

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Eight samples were received under chain of custody on August 26, 2003. The samples were received in good condition at temperatures of 3.0, 2.9, 4.2, 3.2, and 4.0°C.

## GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The surrogate recovery of Fluorene-d10 was below the 30% threshold for the Method Blank. The surrogate recovery of Chrysene-d12 was below the 30% threshold for samples D3H260172-002, 003, 004, 005, and the MS/MSD of sample 001.

The Laboratory Control Sample recovery for Quinoline was below the lower control limit. Quinoline historically performs poorly and it was recovered within control limits in the MS/MSD.

The MS/MSD performed on sample D3H260172-001 demonstrated recoveries that were below the control limits for Benzo(e)pyrene and Chrysene.

Detections in the Field Blank and Field Blank Duplicate are less than the reporting limit.

No other anomalies were observed.

# **Data Completeness for Method 8270C SIM**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETENESS CALCULATION								
	D3H260172							
ANALYSIS:	: SW846-8270C SIM							
QC Parameter	Data	Valid Data						
	Planned	Obtained						
Method Blank	31	31						
MB Surrogates	3	2						
LC\$	7	6						
LCS Surrogates	3	3						
FB/FBD	62	62						
MS	7	5						
MS Surrogates	3	2						
MSD	7	5						
MSD Surrogates	3	2						
MS/MSD RPD	7	7						
Sample/Dup. RPD	31	31						
Sample Surrogates	24	20						
Samples and QC	36	36						
Internal Standard Area								
TOTAL	224	207						
% Completeness	94.6%							

<sup>\*</sup>A MS/MSD was performed on sample SLP3 08-25-03.

# Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD				<del></del>	
LOT D3H260172					
Sample: SLP3 08-25-03		DUP: SLP3D 08-25-03			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	ND	Acenaphthene	ND	0.0	
Acenaphthylene	ND	Acenaphthylene	ND	0.0	
Acridine	ND	Acridine	ND	0.0	
Anthracene	ND	Anthracene	ND	0.0	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	ND	Benzo(b)thiophene	ND	0.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	ND	Carbazole	ND	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	j
Dibenzofuran	ND	Dibenzofuran	ND	0.0	
Dibenzothiophene	ND	Dibenzothiophene	ND	0.0	
2,3-Dihydroindene	ND	2,3-Dihydroindene	ND	0.0	
Fluoranthene	ND	Fluoranthene	ND	0.0	
Fluorene	ND	Fluorene	ND	0.0	
Indene	ND	Indene	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	2.3	Indole	ND	NC	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	ND	1-Methylnaphthalene	ND	0.0	
Naphthalene	ND	Naphthalene	ND	0.0	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	ND	Phenanthrene	ND	0.0	
Pyrene	ND	Pyrene	ND	0.0	
Quinoline	ND	Quinoline	ND	0.0	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3H260172

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
SLP3 08-25-03 08/25/03 12:20 001				
Indole	2.3 J	4.7	ng/L	SW846 8270C SIM
W122-082503 08/25/03 17:05 003				
			,	
Acenaphthene	2.7 J	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	1.2 J	4.8	ng/L	SW846 8270C SIM
Acridine	33	6.2	ng/L	SW846 8270C SIM
Anthracene	13	4.2	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	2.7 Ј	4.1	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	2.0 J	6.2	ng/L	SW846 8270C SIM
Benzo(a) pyrene	1.0 J	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	1.3 J	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	1.4 J	5.2	ng/L	SW846 8270C SIM
Carbazole	5.0	3.8	ng/L	SW846 8270C SIM
Dibenzofuran	1.6 J	5.7	ng/L	SW846 8270C SIM
2,3-Dihydroindene	5.3	5.0	ng/L	SW846 8270C SIM
Fluoranthene	6.2	4.6	ng/L	SW846 8270C SIM
Fluorene	2.5 J	4.1	ng/L	SW846 8270C SIM
Indene	7.7	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	7.4	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	6.3	5.6	ng/L	SW846 8270C SIM
Naphthalene	14	8.6	ng/L	SW846 8270C SIM
Phenanthrene	6.8	6.3	ng/L	SW846 8270C SIM
Pyrene	19	4.2	ng/L	SW846 8270C SIM
W411-082503 08/25/03 15:35 004				
Acenaphthene	2.2 J	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	1.1 J	4.8	ng/L	SW846 8270C SIM
Anthracene	7.3	4.2	ng/L	SW846 8270C SIM
Carbazole	4.6	3.8	ng/L	SW846 8270C SIM
Dibenzofuran	1.1 J	5.7	ng/L	SW846 8270C SIM
2,3-Dihydroindene	1.6 J	5.0	ng/L	SW846 8270C SIM
Fluoranthene	3.5 J	4.6	ng/L	SW846 8270C SIM
Fluorene	2.0 J	4.1	ng/L	SW846 8270C SIM
Indene	3.3 Л	4.7	ng/L	SW846 8270C SIM
Indole	1.3 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	4.7 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	3.8 Л	5.6	ng/L	SW846 8270C SIM
Naphthalene	7.8 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	4.5 J	6.3	ng/L	SW846 8270C SIM
Pyrene	8.3	4.2	ng/L	SW846 8270C SIM
Quinoline	1.6 J	9.0	ng/L	SW846 8270C SIM

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

## D3H260172

			REPORTING		ANALYTICAL
	PARAMETER	RESULT	LIMIT	UNITS	METHOD
W133-0	82503 08/25/03 17:35 005				
	Acenaphthene	9.2	5.7	ng/L	SW846 8270C SIM
	Acenaphthylene	1.2 J	4.8	ng/L	SW846 8270C SIM
	Acridine	6.3	6.2	ng/L	SW846 8270C SIM
	Anthracene	2.4 J	4.2	ng/L	SW846 8270C SIM
	Benzo(a)anthracene	1.7 J	4.3	ng/L	SW846 8270C SIM
	Benzo(b) fluoranthene	2.0 J	4.7	ng/L	SW846 8270C SIM
	Benzo(k) fluoranthene	1.9 J	4.1	ng/L	SW846 8270C SIM
	Benzo(a)pyrene	1.6 J	2.5	ng/L	SW846 8270C SIM
	Benzo(e)pyrene	1.7 J	4.3	ng/L	SW846 8270C SIM
	Benzo(b)thiophene	15	5.2	ng/L	SW846 8270C SIM
	Biphenyl	3.4 J	5.6	ng/L	SW846 8270C SIM
	Carbazole	9.0	3.8	ng/L	SW846 8270C SIM
	Chrysene	1.6 J	5.6	ng/L	SW846 8270C SIM
	Dibenzofuran	2.1 J	5.7	ng/L	SW846 8270C SIM
	Dibenzothiophene	9.1	4.1	ng/L	SW846 8270C SIM
	2,3-Dihydroindene	23	5.0	ng/L	SW846 8270C SIM
	Fluoranthene	4.1 J	4.6	ng/L	SW846 8270C SIM
	Fluorene	2.0 J	4.1	ng/L	SW846 8270C SIM
	Indene	11	4.7	ng/L	SW846 8270C SIM
	Indole	2.3 J	4.7	ng/L	SW846 8270C SIM
	2-Methylnaphthalene	11	5.9	ng/L	SW846 8270C SIM
	1-Methylnaphthalene	14	5.6	ng/L	SW846 8270C SIM
	Naphthalene	280	8.6	ng/L	SW846 8270C SIM
	Perylene	1.1 J	3.3	ng/L	SW846 8270C SIM
	Phenanthrene	1.6 J	6.3	ng/L	SW846 8270C SIM
	Pyrene	4.1 J	4.2	ng/L	SW846 8270C SIM
	Quinoline	2.0 J	9.0	ng/L	SW846 8270C SIM
W412-0	82503 08/25/03 14:35 006				
	Acenaphthene	2.9 Ј	5.7	ng/L	SW846 8270C SIM
	Acridine	33	6.2	ng/L	SW846 8270C SIM
	Anthracene	2.7 <b>J</b>	4.2	ng/L	SW846 8270C SIM
	Benzo(b) fluoranthene	4.8	4.7	ng/L	SW846 8270C SIM
	Benzo(k) fluoranthene	4.2	4.1	ng/L	SW846 8270C SIM
	Benzo(ghi)perylene	2.4 J	6.2	ng/L	SW846 8270C SIM
	Benzo(b) thiophene	4.4 J	5.2	ng/L	SW846 8270C SIM
	Biphenyl	1.4 J	5.6	ng/L	SW846 8270C SIM
	Carbazole	3.9	3.8	ng/L	SW846 8270C SIM
	Dibenzofuran	1.1 J	5.7	ng/L	SW846 8270C SIM
	Dibenzothiophene	3.2 J	4.1	ng/L	SW846 8270C SIM
	2,3-Dihydroindene	5.0	5.0	ng/L	SW846 8270C SIM
	Fluoranthene	5.1	4.6	ng/L	SW846 8270C SIM

(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3H260172

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W412-082503 08/25/03 14:35 006				
Fluorene	2.9 J	4.1	ng/L	SW846 8270C SIM
Indene	6.1	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	5.6 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	5.2 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	14	8.6	ng/L	SW846 8270C SIM
Phenanthrene	15	6.3	ng/L	SW846 8270C SIM
Pyrene	18	4.2	ng/L	SW846 8270C SIM
Quinoline	3.3 J	9.0	ng/L	SW846 8270C SIM
W412FB-082503 08/25/03 14:25 007				
Benzo(a)anthracene	1.2 J	4.3	ng/L	SW846 8270C SIM
1-Methylnaphthalene	0.99 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	2.2 J	8.6	ng/L	SW846 8270C SIM
Pyrene	1.2 J	4.2	ng/L	SW846 8270C SIM
W412FBD-082503 08/25/03 14:30 008				
Naphthalene	1.6 J	8.6	ng/L	SW846 8270C SIM

# **METHODS SUMMARY**

### D3H260172

PARAMETER

ANALYTICAL PREPARATION METHOD

METHOD

Base/Neutrals and Acids

SW846 8270C SIM SW846 3520C

References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

# D3H260172

ANALYTICAL		ANALYST
METHOD	ANALYST	<u>ID</u>
SW846 8270C SIM	Tim O'Donnell	000443

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **SAMPLE SUMMARY**

### D3H260172

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FW15V	001	SLP3 08-25-03	08/25/03	12:20
FW150	002	SLP3D 08-25-03	08/25/03	12:25
FW156	003	W122-082503	08/25/03	17:05
FW16D	004	W411-082503	08/25/03	15:35
FW16F	005	W133-082503	08/25/03	17:35
FW16G	006	W412-082503	08/25/03	14:35
FW16H	007	W412FB-082503	08/25/03	14:25
FW16K	800	W412FBD-082503	08/25/03	14:30

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: SLP3 08-25-03

# GC/MS Semivolatiles

Lot-Sample #: D3H260172-001 Date Sampled: 08/25/03 Prep Date: 08/29/03 Prep Batch #: 3241187 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/26/03 09/29/03	Matrix WG	
Different Pactor. 1	Method:	SW846 8270	270C SIM	
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	5.7	ng/L	
Acenaphthylene	ND	4.8	ng/L	
Acridine	ND	6.2	ng/L	
Anthracene	ND	4.2	ng/L	
Benzo(a) anthracene	ND	4.3	ng/L	
Benzo(b) fluoranthene	ND	4.7	ng/L	
Benzo(k) fluoranthene	ND	4.1	ng/L	
2,3-Benzofuran	ND	5.4	ng/L	
Benzo(ghi)perylene	ND	6.2	ng/L	
Benzo(a) pyrene	ND	2.5	ng/L	
Benzo(e)pyrene	ND	4.3	ng/L	
Benzo(b)thiophene	ND	5.2	ng/L	
Biphenyl	ND	5.6	ng/L	
Carbazole	ND	3.8	ng/L	
Chrysene	ND	5.6	ng/L	
Dibenzo(a,h)anthracene	ND	5.9	ng/L	
Dibenzofuran	ND	5.7	ng/L	
Dibenzothiophene	ND	4.1	ng/L	
2,3-Dihydroindene	ND	5.0	ng/L	
Fluoranthene	ND	4.6	ng/L	
Fluorene	ND	4.1	ng/L	
Indene	ND	4.7	ng/L	
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	
Indole	2.3 J	4.7	ng/L	
2-Methylnaphthalene	ND	5.9	ng/L	
1-Methylnaphthalene	ND	5.6	ng/L	
Naphthalene	ND	8.6	ng/L	
Perylene	ND	3.3	ng/L	
Phenanthrene	ND	6.3	ng/L	
Pyrene	ND	4.2	ng/L	
Quinoline	ND	9.0	ng/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	30	(30 - 118)		
Fluorene d-10	46	(41 - 162)		
Namhthalana do	EA	(20 200)		

54

(30 - 108)

# NOTE(S):

Naphthalene-d8

J Estimated result. Result is less than RL.

The state of the s

## Client Sample ID: SLP3D 08-25-03

# GC/MS Semivolatiles

	20,12 20		
Lot-Sample #: D3H260172-002	Work Order #:	FW1501AA	Matrix WG
Date Sampled: 08/25/03	Date Received:		
Prep Date: 08/29/03	Analysis Date:		
Prep Batch #: 3241187	Analysis Time:		
Dilution Factor: 1	<b>-</b>		
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	ND	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	21 *	(30 - 118)	
Fluorene d-10	42	(41 - 162)	
Naphthalene-d8	50	(30 - 108)	
•		/	

# Note (S) :

<sup>\*</sup> Surrogate recovery is outside stated control limits.

## Client Sample ID: W122-082503

# GC/MS Semivolatiles

Lot-Sample #: D3H260172-003 Date Sampled: 08/25/03 Prep Date: 08/29/03 Prep Batch #: 3241187 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method	08/26/03 09/29/03 23:18	Matrix: WG
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	2.7 J	5.7	ng/L
Acenaphthylene	1.2 J	4.8	ng/L
Acridine	33	6.2	ng/L
Anthracene	13	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	2.7 J	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene Benzo(a)pyrene	2.0 J 1.0 J	6.2 2.5	ng/L
	1.3 J	4.3	ng/L
Benzo(e)pyrene Benzo(b)thiophene	1.4 J	4.3 5.2	ng/L
<del>-</del>	ND	5.6	ng/L
Biphenyl Carbazole	5.0		ng/L
Chrysene	ND	<b>3.8</b> 5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	1.6 J	5.7	ng/L ng/L
Dibenzothiophene	ND	4.1	3.
2,3-Dihydroindene	5.3	5.0	ng/L ng/L
Fluoranthene	6.2	4.6	ng/L
Fluorene	2.5 J	4.1	_
Indene	7.7	4.7	ng/L
	ND	5.4	ng/L
Indeno(1,2,3-cd)pyrene Indole	ND	4.7	ng/L
2-Methylnaphthalene	7. <b>4</b>	4. / 5. 9	ng/L
1-Methylnaphthalene	6.3	5.6	ng/L
Naphthalene	14	8.6	ng/L
Perylene	ND	3.3	<b>ng/L</b> ng/L
Phenanthrene	6.8	6.3	ng/L
Pyrene	19	4.2	ng/L
Quinoline	ND		<del>-</del> -
Agriorine	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY_	LIMITS	
Chrysene-dl2	12 *	(30 - 118)	
Fluorene d-10	66	(41 - 162)	
Naphthalene-d8	45	(30 - 108)	

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W411-082503

# GC/MS Semivolatiles

Lot-Sample #: D3H260172-004	Work Order #: FW16D1AA	Matrix WG
Date Sampled • 08/25/03	Date Received 08/26/03	

 Date Sampled...:
 08/25/03
 Date Received...:
 08/26/03

 Prep Date.....:
 08/29/03
 Analysis Date...:
 09/29/03

 Prep Batch #...:
 3241187
 Analysis Time...:
 23:57

Dilution Factor: 1

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	2.2 J	5.7	ng/L
Acenaphthylene	1.1 J	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	7.3	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	4.6	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	1.1 J	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	1.6 J	5.0	ng/L
Fluoranthene	3.5 J	4.6	ng/L
Fluorene	2.0 J	4.1	ng/L
Indene	3.3 Ј	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	1.3 J	4.7	ng/L
2-Methylnaphthalene	4.7 J	5.9	ng/L
1-Methylnaphthalene	3.8 J	5.6	ng/L
Naphthalene	7.8 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	4.5 J	6.3	ng/L
Pyrene	8.3	4.2	ng/L
Quinoline	1.6 J	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	16 *	(30 - 118	<u>,                                      </u>
Fluorene d-10	43	(41 - 162	
Naphthalene-d8	35	(30 - 108	
infinitatene_do	J.J.	/20 - TOO	,

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W133-082503

## GC/MS Semivolatiles

Lot-Sample #: D3H260172-005 Date Sampled: 08/25/03 Prep Date: 08/29/03 Prep Batch #: 3241187 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	08/26/03 10/01/03	Matrix wG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	9.2	5.7	ng/L
Acenaphthylene	1.2 J	4.8	ng/L
Acridine	6.3	6.2	ng/L
Anthracene	2.4 J	4.2	ng/L
Benzo (a) anthracene	1.7 J	4.3	ng/L
Benzo(b) fluoranthene	2.0 J	4.7	ng/L
Benzo(k) fluoranthene	1.9 J	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	1.6 J	2.5	ng/L
Benzo(e)pyrene	1.7 J	4.3	ng/L
Benzo(b) thiophene	15	5.2	ng/L
Bipheny1	3.4 J	5.6	ng/L
Carbazole	9.0	3.8	ng/L
Chrysene	1.6 J	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	2.1 J	5.7	ng/L
Dibenzothiophene	9.1	4.1	ng/L
2,3-Dihydroindene	23	5.0	ng/L
Fluoranthene	4.1 J	4.6	ng/L
Fluorene	2.0 J	4.1	ng/L
Ind <b>e</b> ne	11	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	2.3 J	4.7	ng/L
2-Methylnaphthalene	11	5.9	ng/L
1-Methylnaphthalene	14	5.6	ng/L
Naphthalene	280	8.6	ng/L
Perylene	1.1 J	3.3	ng/L
Phenanthrene	1.6 J	6.3	ng/L
Pyrene	4.1 J	4.2	ng/L
Quinoline	2.0 J	9.0	ng/L
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Chrysene-d12	15 *	(30 - 118)	
Fluorene d-10	49	(41 - 162)	
Naphthalene-d8	55	(30 - 108)	

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W412-082503

# GC/MS Semivolatiles

Lot-Sample #: D3H260172-006	Work Order #:	EWI COLAR	Matrix WG
Date Sampled: 08/25/03	Date Received:		MACIIX wg
Prep Date: 08/29/03	Analysis Date:		
Prep Batch #: 3241187	Analysis Date:		
Dilution Factor: 1	Analysis lime:	00:12	
Difficion Factor: 1	Method:	CMO/E 9270	OC STM
	rectiou:	SW040 0270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	2.9 J	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	33	6.2	ng/L
Anthracene	2.7 J	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	4.8	4.7	ng/L
Benzo(k) fluoranthene	4.2	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	2.4 J	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	4.4 J	5.2	ng/L
Biphenyl	1.4 J	5.6	ng/L
Carbazole	3.9	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	1.1 J	5. <b>7</b>	ng/L
Dibenzothiophene	3.2 J	4.1	ng/L
2,3-Dihydroindene	5.0	5.0	ng/L
Fluoranthene	5.1	4.6	ng/L
Fluorene	2.9 J	4.1	ng/L
Indene	6.1	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	5.6 J	5.9	ng/L
1-Methylnaphthalene	5.2 J	5.6	ng/L
Naphthalene	14	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	15	6.3	ng/L
Pyrene	18	4.2	ng/L
Quinoline	3.3 J	9.0	ng/L
	7777 CT377	DD 644	
CIDDOCATE	PERCENT	RECOVERY	
SURROGATE Chrysene-dl2	RECOVERY	LIMITS	
Fluorene d-10	38	(30 - 118)	
Naphthalene-d8	60	(41 - 162)	
wahucuatene-da	44	(30 - 108)	

J Estimated result. Result is less than RL.

# Client Sample ID: W412FB-082503

# GC/MS Semivolatiles

Tet Comple # . Dauge0172 007	Work Order #:	ביאו בעו א	Matrix WG
Lot-Sample #: D3H260172-007	Date Received:		MacLin
Date Sampled: 08/25/03	Analysis Date:		
Prep Date: 08/29/03 Prep Batch #: 3241187	Analysis Date		
Dilution Factor: 1	Analysis lime	00:50	
Dilution Factor: 1	Method:	CW046 0270	C CTM
	method:	5W646 02/U	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo (a) anthracene	1.2 J	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	ND	5 <b>.9</b>	ng/L
1-Methylnaphthalene	0.99 J	5.6	ng/L
Naphthalene	2.2 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	1.2 J	4.2	ng/L
Quinoline	ND	9.0	ng/L
_		-	· •
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	54	(30 - 118)	
Fluorene d-10	44	(41 - 162)	
Naphthalene-d8	57	(30 - 108)	
<del>-</del>		. =	

J Estimated result. Result is less than RL.

Note(s):

# Client Sample ID: W412FBD-082503

## GC/MS Semivolatiles

Lot-Sample #: I	D3H260172-008	Work Order #:	FW16K1AA	Matrix
Lot-Sample #: I	D3H260172-008	work Order #:	FW16KLAA	Matrix:

 Date Sampled...:
 08/25/03
 Date Received...:
 08/26/03

 Prep Date.....:
 08/29/03
 Analysis Date...:
 10/02/03

 Prep Batch #...:
 3241187
 Analysis Time...:
 01:29

Dilution Factor: 1

Method.....: SW846 8270C SIM

	Method: SW846 8270C SIM		OC SIM	
		REPORTING	REPORTING	
PARAMETER	RESULT	LIMIT	UNITS	
Acenaphthene	ND	5.7	ng/L	
Acenaphthylene	ND	4.8	ng/L	
Acridine	ND	6.2	ng/L	
Anthracene	ND	4.2	ng/L	
Benzo(a) anthracene	ND	4.3	ng/L	
Benzo(b) fluoranthene	ND	4.7	ng/L	
Benzo(k)fluoranthene	ND	4.1	ng/L	
2,3-Benzofuran	ND	5.4	ng/L	
Benzo(ghi)perylene	ND	6.2	ng/L	
Benzo(a) pyrene	ND	2.5	ng/L	
Benzo(e)pyrene	ND	4.3	ng/L	
Benzo(b) thiophene	ND	5.2	ng/L	
Biphenyl	ND	5.6	ng/L	
Carbazole	ND	3.8	ng/L	
Chrysene	ND	5.6	ng/L	
Dibenzo(a,h)anthracene	ND	5.9	ng/L	
Dibenzofuran	ND	5.7	ng/L	
Dibenzothiophene	ND	4.1	ng/L	
2,3-Dihydroindene	ND	5.0	ng/L	
Fluoranthene	ND	4.6	ng/L	
Fluorene	ND	4.1	ng/L	
Indene	ND	4.7	ng/L	
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	
Indole	ND	4.7	ng/L	
2-Methylnaphthalene	ND	5.9	ng/L	
1-Methylnaphthalene	ND	5.6	ng/L	
Naphthalene	1.6 J	8.6	ng/L	
Perylene	ND	3.3	ng/L	
Phenanthrene	ND	6.3	nq/L	
Pyrene	ND	4.2	ng/L	
Quinoline	ND	9.0	ng/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	45	(30 - 118	<del>)</del>	
Fluorene d-10	42	(41 - 162		
Naphthalene-d8				

NOTE (S):

J Estimated result. Result is less than RL.

# QC DATA ASSOCIATION SUMMARY

# D3H260172

# Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3241187	3241098
002	₩G	SW846 8270C SIM		3241187	3241098
003	₩G	SW846 8270C SIM		3241187	3241098
004	WG	SW846 8270C SIM		3241187	3241098
005	₩G	SW846 8270C SIM		3241187	3241098
006	WG	SW846 8270C SIM		3241187	3241098
007	WG	SW846 8270C SIM		3241187	3241098
008	WG	SW846 8270C SIM		3241187	3241098

#### METHOD BLANK REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H260172

Work Order #...: FW9PR1AA

Matrix..... WATER

MB Lot-Sample #: D3H290000-187

Prep Date....: 08/29/03 Prep Batch #...: 3241187

Analysis Time..: 17:42

SW846 8270C SIM

SW846 8270C SIM

SW846 8270C SIM

Analysis Date..: 09/29/03

Dilution Factor: 1

PARAMETER

Acridine

Anthracene

Acenaphthene

Acenaphthylene

2.3-Benzofuran

Benzo(a)pyrene

Benzo(e)pyrene

Biphenyl

Chrysene

Carbazole

Dibenzofuran

Fluoranthene

Naphthalene

Phenanthrene

Perylene

Quinoline

Pyrene

Fluorene

Indene

Indole

Dibenzothiophene

2,3-Dihydroindene

Benzo(b) thiophene

RESULT UNITS METHOD LIMIT ND 5.7 ng/L SW846 8270C SIM ND 4.8 ng/L SW846 8270C SIM ND 6.2 SW846 8270C SIM ng/L ND 4.2 nq/L SW846 8270C SIM Benzo (a) anthracene ND 4.3 ng/L SW846 8270C SIM Benzo(b) fluoranthene ND 4.7 ng/L SW846 8270C SIM Benzo(k) fluoranthene ND 4.1 ng/L SW846 8270C SIM ND 5.4 ng/L SW846 8270C SIM Benzo(ghi) perylene ND 6.2 nq/L SW846 8270C SIM ND 2.5 ng/L SW846 8270C SIM ND 4.3 ng/L SW846 8270C SIM ND 5.2 nq/L SW846 8270C SIM ND 5.6 ng/L SW846 8270C SIM ND 3.8 ng/L SW846 8270C SIM ND 5.6 ng/L SW846 8270C SIM Dibenzo(a,h)anthracene ND 5.9 ng/L SW846 8270C SIM ND 5.7 ng/L SW846 8270C SIM ND 4.1 ng/L SW846 8270C SIM ND 5.0 ng/L SW846 8270C SIM ND 4.6 ng/L SW846 8270C SIM ND 4.1 nq/L SW846 8270C SIM ND 4.7 ng/L SW846 8270C SIM Indeno(1,2,3-cd)pyrene ND 5.4 ng/L SW846 8270C SIM ND 4.7 ng/L SW846 8270C SIM 2-Methylnaphthalene ND 5.9 ng/L SW846 8270C SIM 1-Methylnaphthalene ND 5.6 ng/L SW846 8270C SIM ND 8.6 ng/L SW846 8270C SIM ND 3.3 ng/L SW846 8270C SIM

6.3

4,2

9.0

ng/L

ng/L

ng/L

REPORTING

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS			
Chrysene-d12	31	(30 - 118)			
Fluorene d-10	28 *	(41 - 162)			
Naphthalene-d8	40	(30 - 708)			

ND

ND

ND

### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Surrogate recovery is outside stated control limits.

# LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H260172 Work Order #...: FW9PR1AC Matrix.....: WATER

LCS Lot-Sample#: D3H290000-187

 Prep Date....:
 08/29/03
 Analysis Date..:
 09/29/03

 Prep Batch #...:
 3241187
 Analysis Time..:
 18:19

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	52	(30 - 150)	SW846 8270C SIM
Chrysene	47	(30 - 132)	SW846 8270C SIM
Fluorene	56	(30 - 132)	SW846 8270C SIM
Indene	58	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	55	(30 - 150)	SW846 8270C SIM
Naphthalene	63	(30 - 150)	SW846 8270C SIM
Quinoline	11 a	(30 - 150)	SW846 8270C SIM
		DED CENT	PECOMEDY

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	61	(30 - 118)
Fluorene d-10	39 *	(41 - 162)
Naphthalene-d8	58	(30 - 108)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

- \* Surrogate recovery is outside stated control limits.
- a Spiked analyte recovery is outside stated control limits.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H260172 Work Order #...: FW9PR1AC Matrix.....: WATER

LCS Lot-Sample#: D3H290000-187

 Prep Date.....:
 08/29/03
 Analysis Date..:
 09/29/03

 Prep Batch #...:
 3241187
 Analysis Time..:
 18:19

Dilution Factor: 1

DAD AMERICA	SPIKE	MEASURED	INITEG	PERCENT	MURINOP		
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD		
Benzo(e)pyrene	10.0	5.25	ng/L	52	SW846 8270C S		
Chrysene	10.0	4.72	ng/L	47	SW846 8270C S		
Fluorene	10.0	5.57	ng/L	56	SW846 8270C S		
Indene	10.0	5.78	ng/L	58	SW846 8270C S		
2-Methylnaphthalene	10.0	5.55	ng/L	55	SW846 8270C S		
Naphthalene	10.0	6.28	ng/L	63	SW846 8270C S		
Quinoline	10.0	1.13 a	ng/L	11	SW846 8270C S		
	•	PERCENT	RECOVERY				
SURROGATE		RECOVERY	LIMITS				
Chrysene-dl2		61	(30 - 118	)			
Fluorene d-10		39 *	(41 - 162	}			
Naphthalene-d8		58	(30 - 108	)			

# NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

### MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3H260172 Work Order #...: FW15V1AC-MS Matrix.....: WG

MS Lot-Sample #: D3H260172-001 FW15V1AD-MSD

 Date
 Sampled...:
 08/25/03
 Date
 Received...:
 08/26/03

 Prep
 Date...:
 08/29/03
 Analysis
 Date...:
 09/29/03

 Prep
 Batch #...:
 3241187
 Analysis
 Time...:
 21:25

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo(e)pyrene	0.0 a	(30 - 150)			SW846 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
Chrysene	19 a	(30 - 132)			SW846 8270C SIM
	13 a	(30 - 132)	34	(0-50)	SW846 8270C SIM
Fluorene	66	(30 - 132)			SW846 8270C SIM
	46	(30 - 132)	33	(0-50)	SW846 8270C SIM
Indene	56	(30 - 150)			SW846 8270C SIM
	38	(30 - 150)	36	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	56	(30 - 150)			SW846 8270C SIM
	41	(30 - 150)	29	(0-50)	SW846 8270C SIM
Naphthalene	65	(30 - 150)			SW846 8270C SIM
	47	(30 - 150)	30	(0-50)	SW846 8270C SIM
Quinoline	53	(30 - 150)			SW846 8270C SIM
	54	(30 - 150)	4.3	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	_
Chrysene-d12		25 *		(30 - 118)	<del>)</del>
		18 *		(30 - 118	)
Fluorene d-10		59		(41 - 162	>
		40 *		(41 - 162	)
Naphthalene-d8		55		(30 - 108	)
		41		(30 - 108	)

### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold prim denotes control parameters

<sup>\*</sup> Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

## MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3H260172 Work Order #...: FW15V1AC-MS Matrix..... WG

MS Lot-Sample #: D3H260172-001 FW15V1AD-MSD

**Date Sampled...:** 08/25/03

Date Received..: 08/26/03 **Prep Date....:** 08/29/03 **Analysis Date..:** 09/29/03 Prep Batch #...: 3241187 Analysis Time..: 21:25

Dilution Factor: 1

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
Benzo(e)pyrene	ND	9.53	0.0	ng/L	0.0 a		SW846 8270C SIM
• • • •	ND	9.71	0.0	ng/L	0.0 a	0.0	SW846 8270C SIM
Chrysene	ND	9.53	1.79	ng/L	19 a		SW846 8270C SIM
_	ND	9.71	1.26	ng/L	13 a	34	SW846 8270C SIM
Fluorene	ND	9.53	6.28	ng/L	66		SW846 8270C SIM
	ND	9.71	4.49	ng/L	46	33	SW846 B270C SIM
Indene	NID	9.53	5.34	ng/L	56		SW846 8270C SIM
	ND	9.71	3.71	ng/L	38	36	SW846 8270C SIM
2-Methylnaphthalene	ND	9.53	5.37	ng/L	56		SW846 8270C SIM
	ND	9.71	4.03	ng/L	41	29	SW846 8270C SIM
Naphthalene	ND	9.53	6.15	ng/L	65		SW846 8270C SIM
	ND	9.71	4.52	ng/L	47	30	SW846 8270C SIM
Quinoline	ND	9.53	5.07	ng/L	53		SW846 8270C SIM
	ND	9.71	5.29	ng/L	54	4.3	SW846 8270C SIM

PERCENT	RECOVERY			
RECOVERY	LIMITS			
25 *	(30 - 118)			
18 *	(30 ~ 118)			
59	(41 - 162)			
40 *	(41 - 162)			
55	(30 - 108)			
41	(30 - 108)			
	RECOVERY 25 * 18 * 59 40 * 55			

## NOTE(S):

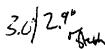
Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

# Chain of **Custody Record**





STL-4124 (0901)																						
CITY OF ST. LOVE HER.		Project			T A	lus	F.P.	حد،	J							ate 8	25	63	•	Ch	ain of Custody N	<sup>umber</sup> 1762
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City State Zip	Code SS416	Site Co	ntact			L	ab Cor	ntact			-	_	la-		Analys nore s	sis (A pace	ttach is nee	list if eded)	-			
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Contract/Purchase Order/Quote No.				Ма	atrix			Con Pres	taine erva	rs & tives					ľ						Condition	s of Receipt
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n-Hazard  Flammable  Skin trritant	Poison B	Unknown	- 1	•	ırn To (			Dispo	sal E	y Lab	1		Archiv	e For		Monti			ay be a an 1 m		ed if samples are	retained
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Chain of Custody Record								۲.	2/3	,٤٠	Hö	S E V T R	E R I E N I VICES		Seve	rn T	Гrer	nt Laborat	ories, Inc.
Client it al St. Louis Park		Project M	lanager	A	md	<b>U</b> 50	3n						E C	8/2	5/07	 !		Chain of Custody No	749
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5f. Louis Park MU 55	416	Site Con	act		Ì	Lab Co	ntact	n 57	fring	o⁄			Analys more s					]	
Project Name and Location (State)		Carrier/M	/aybill N	umber		<b></b> .												Special I	nstructions/
Contract/Purchase Order/Quote No.			٨	fatrix				taine erva			3								s of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Aguecus	Sec.		Unpres. H2SO4	HNO3	řÇ	NaOH ZnAc/	NaOH	2								
W122-082503 1 8/	35b3 1:	705	X			6		$\Box$		T	X								
W411 -082503		735	$\sqcap$		П	1	1				<b>11</b> 1							011	4 PPJ-5
W133-082503	7	35			$\Box$	$\Pi^-$	1			+	11				11	1		1 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<del>, ,,                                  </del>
W412-082503		135	1			V		П											
W412-082503 W412FB-082507	7	125	1	_ -			1	1	_	+	1 1	+ 1	_		<del>     </del>	+			
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Non-Hazard	oison B 🔲 L	Inknown		-			Dispo C Real		y Lab ents (S			e For _		Months			e asse 1 month	ssed if samples are i	retained
24 Hours 48 Hours 7 Days 14 Days	☐ 21 Days	☐ Other				_   -				\ \	,								
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DISTRIBUTION: WHITE Returned to Client with Report: CANARY - Stays with the Sample; PINK - Field Copy



#### **DATA QUALITY ASSESSMENT**

STL Project # D3H260172 (T)

March 5, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of eight aqueous samples for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on August 25, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3H260172.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

### **SAMPLES**

The samples included in this review are listed below:

SLP3-082503

SLP3D-082503

W122-082503

W411-082503

W133-082503

W412-082503

W412FB-082503

W412FBD-082503

## **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results



- Field duplicate results
- Quantitation limits and sample results

#### DISCUSSION

## Agreement of Analyses Conducted with COC Requests

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

# **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.9°C and 4.2°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### **Method Blanks**

There was one method blank for this data package, prep batch 3241187. Target analytes were not detected in the laboratory method blank. There were four compounds detected in the field blank submitted for this data package. They were benzo(a)anthracene, 1-methylnaphthalene, naphthalene, and pyrene.

## Surrogate Spike Recoveries

The percent recoveries of the surrogates were low in four of the eight samples for for chrysene-d12. Fluorene-d10 was also low in the Blank, LCS, and MS/MSD. All other surrogates were in control of the QAPP limits.

### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses except for quinoline. Quinoline was recovered at only 11% of the required 30%.

#### MS/MSD Results

MS/MSD analyses were performed on sample SLP9-082503. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for benzo(e)pyrene was 0% for the MS and MSD. Chrysene had lower recoveries to report in the MS and MSD. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	0/0	ok	30-150/0-50
Chrysene	19/13	ok	30-132/0-50



# **Field Duplicate Results**

Sample SLP3-082503 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for the detected analytes. Only one out of 31 compounds was detected with a RPD range of 2.3%.

# **Quantitation Limits and Sample Results**

There were no samples analyzed using a dilution.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

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# ANALYTICAL REPORT

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3I030310

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Gail DeRuzzo Project Manager

October 6, 2003

# **Table Of Contents**

# Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables	
(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
Table of Contents	L
Case Narrative	
Executive Summary – Detection Highlights	
Methods Summary	
Method/Analyst Summary	
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	
Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
Subcontracted Data	

# CASE NARRATIVE D31030310

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

# Sample Receiving

Eight samples were received under chain of custody on September 3, 2003. The samples were received in good condition at temperatures of 2.3, 2.4, 2.2, 2.1, and 2.8°C.

## GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The surrogate recovery of Chrysene-d12 was below the 30% threshold for samples D3I030310-001, 004 (1x), 004 (2x), 005, 006, 007, 008, and the MS/MSD of sample 005.

Sample D3I030310-004 was analyzed at a 2-fold dilution to obtain 2,3-Dihydroindene within the calibration range. All other analyses for this sample are reported from the undiluted analysis.

Sample D3I030310-005 was analyzed at a 10-fold dilution to obtain Acenaphthene, Benzo(b)thiophene, Carbazole, 2,3-Dihydroindene, Indene, and 1-Methylnaphthalene within the calibration range. All other analytes for this sample are reported from the undiluted analysis. The surrogate recoveries could not be calculated in the 10-fold dilution.

Sample D3I030310-006 was analyzed at a 10-fold dilution to obtain Acenaphthene, Benzo(b)thiophene, Carbazole, Dibenzofuran, 2,3-Dihydroindene, Fluroene, Indene, and 1-Methylnaphthalene, and Phenanthrene within the calibration range. All other analytes for this sample are reported from the undiluted analysis. The surrogate recoveries could not be calculated in the 10-fold dilution.

Sample D3I030310-007 was analyzed at a 25-fold dilution to obtain target analytes within the calibration range. Benzo(b)fluoranthene, Benzo(k)fluoranthene, 2,3-Benzofuran, Benzo(ghi)perylene, Benzo(a)pyrene, Benzo(e)pyrene, Dibenzo(a,h)anthracene, Indene, Indeno(1,2,3-cd)pyrene, Indole, Perylene, and Quinoline for this sample are reported from the undiluted analysis. The surrogate recoveries could not be calculated in the 10-fold dilution.

Sample D3I030310-008 was analyzed at a 10-fold dilution to obtain Acenaphthene, 2,3-Dihydroindene, and Fluorene within the calibration range. All other analytes for this sample are

reported from the undiluted analysis. The surrogate recoveries could not be calculated in the 10-fold dilution.

The MS/MSD performed on sample D3I030310-005 demonstrated recoveries that were below the control limits for Benzo(e)pyrene, Chrysene, and Quinoline and above the control limits for Fluorene and Indene.

Detections in the Field Blank and Field Blank Duplicate are less than the reporting limit.

No other anomalies were observed.

# **Data Completeness for Method 8270C SIM**

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETENESS CALCULATION					
LOT: D31030310					
ANALYSIS:	SW846-8270	CSIM			
QC Parameter	Data Planned	Valld Data Obtained			
Method Blank	31	31			
MB Surrogates	3	3			
LCS	7	7			
LCS Surrogates	3	3			
FB/FBD	62	62			
MS	7	3			
MS Surrogates	3	2			
MSD	7	2			
MSD Surrogates .	3	2			
MS/MSD RPD	7	7			
Sample/Dup. RPD	31	31			
Sample Surrogates	27	20			
Samples and QC	51	51			
Internal Standard Area					
TOTAL	242	216			
% Completeness	92.6%				

<sup>\*</sup>A MS/MSD was performed on sample W410-090203.

# Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD	T			1	1
LOT D31030310	1				
Sample: W410-090203		DUP: W410D-090203			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	310	Acenaphthene	350	12.1	1
Acenaphthylene	94	Acenaphthylene	100	6.2	
Acridine	ND	Acridine	ND	0.0	
Anthracene	15	Anthracene	17	12.5	
Benzo(a)anthracene	ND	Benzo(a)anthracene	ND	0.0	
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	4.8	2,3-Benzofuran	ND	NC	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	360	Benzo(b)thiophene	420	15.4	
Biphenyl	96	Biphenyl	110	13.6	
Carbazole	150	Carbazole	150	0.0	
Chrysene	ND	Chrysene	ND	0.0	
Dibenz(a,h)anthracene	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	140	Dibenzofuran	150	6.9	
Dibenzothiophene	10	Dibenzothiophene	12	18.2	
2,3-Dihydroindene	910	2,3-Dihydroindene	1100	18.9	
Fluoranthene	10	Fluoranthene	11	9.5	
Fluorene	150	Fluorene	160	6.5	
Indene	810	Indene	940	14.9	
Indeno(1,2,3-cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	-0.0	
Indole	4.5	Indole	5.9	26.9	
2-Methylnaphthalene	ND	2-Methylnaphthalene	ND	0.0	
1-Methylnaphthalene	490	1-Methylnaphthalene	570	15.1	
Naphthalene	41	Naphthalene	52	23.7	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	150	Phenanthrene	170	12.5	
Pyrene	5.4	Pyrene	5.6	3.6	
Quinoline	7.5	Quinoline	10	28.6	

RPD = Relative Percent Difference

ND = Compound not detected in the sample

p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

## D3T030310

		REPORTING		ANALYTICA <b>L</b>
DADAMETED	RESULT	LIMIT	UNITS	METHOD
PARAMETER	_ KESULI	<u> </u>	011110	
W33-090203 09/02/03 11:15 001				
Acenaphthene	13	5.7	ng/L	SW846 8270C SIM
Acridine	2.6 J	6.2	ng/L	SW846 8270C SIM
Anthracene	4.2	4.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	6.1	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	6.0	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	3.9 Ј	4.1	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	3.5 J	6.2	ng/L	SW846 8270C SIM
Benzo(a) pyrene	5.6	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	3.9 Ј	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	8.1	5.2	ng/L	SW846 8270C SIM
Biphenyl	0.97 J	5.6	ng/L	SW846 8270C SIM
Carbazole	30	3.8	ng/L	SW846 8270C SIM
Chrysene	5.1 J	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	1.4 J	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	2.0 J	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	1.5 J	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	19	5.0	ng/L	SW846 8270C SIM
Fluoranthene	18	4.6	ng/L	SW846 8270C SIM
Fluorene	5.6	4.1	ng/L	SW846 8270C SIM
Indene	4.0 J	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	3.7 J	5.4	ng/L	SW846 8270C SIM
2-Methylnaphthalene	5.3 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	4.7 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	11	8.6	ng/L	SW846 8270C SIM
Perylene	1.3 J	3.3	ng/L	SW846 8270C SIM
Phenanthrene	21	6.3	ng/L	SW846 8270C SIM
Pyrene	19	4.2	ng/L	SW846 8270C SIM
W33FB-090203 09/02/03 10:55 002			<b>0</b> .	
Anthracene	1.2 J	4.2	ng/L	SW846 8270C SIM
Indene	1.3 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.3 J	5.9	ng/L	SW846 8270C SIM
Naphthalene	3.1 J	8.6	ng/L	SW846 8270C SIM
W33FBD-090203 09/02/03 11:00 003				
				G170.4.C. 000.0.C. CT14
Indene	1.2 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.4 J	5.9	ng/L	SW846 8270C SIM
Naphthalene	3.3 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	1.1 J	6.3	ng/L	SW846 8270C SIM

(Continued on next page)

D31030310

		REPORTIN	IG	ANALYTICAL
PARAMETER	RESULT	LIMIT	<u>UNITS</u>	METHOD
W24-090203 09/02/03 13:45 004				
Acenaphthene	19	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	1.4 J	4.8	ng/L	SW846 8270C SIM
Anthracene	4.0 J	4.2	ng/L	SW846 8270C SIM
2,3-Benzofuran	1.2 J	5.4	ng/L	SW846 8270C SIM
Benzo(b)thiophene	2.3 Ј	5.2	ng/L	SW846 8270C SIM
Carbazole	2.3 J	3.8	ng/L	SW846 8270C SIM
2,3-Dihydroindene	190	10	ng/L	SW846 8270C SIM
Fluoranthene	1.5 J	4.6	ng/L	SW846 8270C SIM
Indene	7.2	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	2.9 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	2.3 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	6.5 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	2.2 J	6.3	ng/L	SW846 8270C SIM
Pyrene	2.7 J	4.2	ng/L	SW846 8270C SIM
W410-090203 09/02/03 11:40 005  Acenaphthene	310	57	ng/L	SW846 8270C SIM
Acenaphthene Acenaphthylene	94	4.8	ng/L	SW846 8270C SIM
Anthracene	15	4.2	ng/L	SW846 8270C SIM
2,3-Benzofuran	4.8 J	5.4	ng/L	SW846 8270C SIM
Benzo (b) thiophene	360	52	ng/L	SW846 8270C SIM
Biphenyl	96	5.6	ng/L	SW846 8270C SIM
Carbazole	150	38	ng/L	SW846 8270C SIM
Dibenzofuran	140	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	10	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	910	50	ng/L	SW846 8270C SIM
Fluoranthene	10	4.6	nq/L	SW846 8270C SIM
Fluorene	150	4.1	ng/L	SW846 8270C SIM
Indene	870 E	4.7	ng/L	SW846 8270C SIM
Indene	810	47	ng/L	SW846 8270C SIM
Indole	4.5 J	4.7	ng/L	SW846 8270C SIM
1-Methylnaphthalene	540	5. <b>6</b>	ng/L	SW846 8270C SIM
1-Methylnaphthalene	490	56	ng/L	SW846 8270C SIM
Naphthalene	41	8.6	ng/L	SW846 8270C SIM
Phenanthrene	150	6.3	ng/L	SW846 8270C SIM
Pyrene	5.4	4.2	ng/L	SW846 8270C SIM
Quinoline	7.5 J	9.0	ng/L	SW846 8270C SIM

(Continued on next page)

D3I030310

			REPORTING		ANALYTICAL	
	PARAMETER	RESULT	LIMIT	UNITS	METHOD	
W410D	-090203 09/02/03 11:45 006					
	Acenaphthene	350	57	ng/L	SW846 8270C SIM	
	Acenaphthylene	100	4.8	ng/L	SW846 8270C SIM	
	Anthracene	17	4.2	ng/L	SW846 8270C SIM	
	Benzo(b)thiophene	420	52	ng/L	SW846 8270C SIM	
	Biphenyl	110	5.6	ng/L	SW846 8270C SIM	
	Carbazole	150	38	ng/L	SW846 8270C SIM	
	Dibenzofuran	150	57	ng/L	SW846 8270C SIM	
	Dibenzothiophene	12	4.1	ng/L	SW846 8270C SIM	
	2,3-Dihydroindene	1100	50	ng/L	SW846 8270C SIM	
	Fluoranthene	11	4.6	ng/L	SW846 8270C SIM	
	Fluorene	160	41	ng/L	SW846 8270C SIM	
	Indene	940	47	ng/L	SW846 8270C SIM	
	Indole	5.9	4.7	ng/L	SW846 8270C SIM	
	1-Methylnaphthalene	570	56	ng/L	SW846 8270C SIM	
	Naphthalene	52	8.6	ng/L	SW846 8270C SIM	
	Phenanthrene	170	63	ng/L	SW846 8270C SIM	
		5.6	4.2	ng/L	SW846 8270C SIM	
	Pyrene	<b>3.</b> 0				
<b>W2</b> 3-0	Pyrene Quinoline 90203 09/02/03 12:10 007	10	9.0	ng/L	SW846 8270C SIM	
W23-0	Quinoline 90203 09/02/03 12:10 007	. 10	9.0	ng/L		
<b>W23</b> -0	Quinoline 90203 09/02/03 12:10 007 Acenaphthene	10 4500	9.0	ng/L ng/L	SW846 8270C SIM	
<b>W2</b> 3-0	Quinoline 90203 09/02/03 12:10 007 Acenaphthene Acenaphthylene	10 4500 240	9.0 140 120	ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23</b> -0	Quinoline 90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine	4500 240 300	9.0 140 120 160	ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM	
<b>W2</b> 3-0	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene	4500 240 300 240	9.0 140 120 160 100	ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM	
W23-0	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene	4500 240 300 240 180	9.0 140 120 160 100 110	ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM	
<b>W23</b> -0	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene	4500 240 300 240 180 52	9.0 140 120 160 100 110 4.7	ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene	4500 240 300 240 180 52 2.0 J	9.0 140 120 160 100 110 4.7 6.2	ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene	4500 240 300 240 180 52	9.0 140 120 160 100 110 4.7 6.2 2.5	ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(e)pyrene	10 4500 240 300 240 180 52 2.0 J 36 17	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(e)pyrene Benzo(b)thiophene	4500 240 300 240 180 52 2.0 J 36 17 160	9.0 140 120 160 100 110 4.7 6.2 2.5	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(e)pyrene	4500 240 300 240 180 52 2.0 J 36 17 160 610	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(e)pyrene Benzo(b)thiophene Biphenyl Carbazole	4500 240 300 240 180 52 2.0 J 36 17 160	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(e)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(e)pyrene Benzo(b)thiophene Biphenyl Carbazole	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h)anthracene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J 1200	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9 140	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h)anthracene Dibenzofuran Dibenzothiophene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J 1200 300	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9 140 100	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h)anthracene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J 1200	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9 140	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
<b>W23-0</b>	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h)anthracene Dibenzofuran Dibenzothiophene 2,3-Dihydroindene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J 1200 300 910	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9 140 100 120	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
₩23-0	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h)anthracene Dibenzofuran Dibenzothiophene 2,3-Dihydroindene Fluoranthene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J 1200 300 910 1600 2900	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9 140 100 120 120 120	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	
W23-0	Quinoline  90203 09/02/03 12:10 007  Acenaphthene Acenaphthylene Acridine Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(a)pyrene Benzo(a)pyrene Benzo(b)thiophene Biphenyl Carbazole Chrysene Dibenzo(a,h)anthracene Dibenzofuran Dibenzothiophene 2,3-Dihydroindene Fluorene	10 4500 240 300 240 180 52 2.0 J 36 17 160 610 210 240 1.2 J 1200 300 910 1600	9.0 140 120 160 100 110 4.7 6.2 2.5 4.3 130 140 95 140 5.9 140 100 120 120	ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L	SW846 8270C SIM SW846 8270C SIM	

(Continued on next page)

# D3I030310

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W23-090203 09/02/03 12:10 007				
1-Methylnaphthalene	1600	140	ng/L	SW846 8270C SIM
Naphthalene	4500	220	ng/L	SW846 8270C SIM
Perylene	6.1	3.3	ng/L	SW846 8270C SIM
Phenanthrene	1300	160	ng/L	SW846 8270C SIM
Pyrene	1600	100	ng/L	SW846 8270C SIM
SLP10-090203 09/02/03 12:15 008				
Acenaphthene	500	57	ng/L	SW846 8270C SIM
Acenaphthylene	74	4.8	ng/L	SW846 8270C SIM
Acridine	3.4 J	6.2	ng/L	SW846 8270C SIM
Anthracene	7.2	4.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	1.5 J	4.3	ng/L	SW846 8270C SIM
Benzo(b)thiophene	41	5.2	ng/L	SW846 8270C SIM
Biphenyl	15	5.6	ng/L	SW846 8270C SIM
Carbazole	26	3.8	ng/L	SW846 8270C SIM
Chrysene	0.99 J	5. <b>6</b>	ng/L	SW846 8270C SIM
Dibenzofuran	54	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	18	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	210	50	ng/L	SW846 8270C SIM
Fluoranthene	28	4.6	ng/L	SW846 8270C SIM
Fluorene	130	41	ng/L	SW846 8270C SIM
Indene	56	4.7	ng/L	SW846 8270C SIM
Indole	4.3 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.4 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	<b>8</b> 5	5.6	ng/L	SW846 8270C SIM
Naphthalene	7.5 J	8.6	ng/L	SW846 8270C SIM
Phenanthrene	17	6.3	ng/L	SW846 8270C SIM
Pyrene	53	4.2	ng/L	SW846 8270C SIM
Quinoline	5.7 J	9.0	ng/L	SW846 8270C SIM

# **METHODS SUMMARY**

## D3I030310

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

Base/Neutrals and Acids SW846 8270C SIM SW846 3520C

# References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

## D3I030310

ANALYTICAL		ANALYST
METHOD	ANALYST	<u>ID</u>
SW846 8270C SIM	Tim O'Donnell	000443

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

## D31030310

<u>wo #</u>	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FXJFV	001	W33-090203	09/02/03	11:15
FXJFW	002	W33FB-090203	09/02/03	10:55
FXJF0	003	W33FBD-090203	09/02/03	11:00
FXJF1	004	W24-090203	09/02/03	13:45
FXJF4	005	W410-090203	09/02/03	11:40
FXJF7	006	W410D-090203	09/02/03	11:45
FXJGC	007	W23-090203	09/02/03	12:10
FXJGE	008	SLP10-090203	09/02/03	12:15

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: W33-090203

# GC/MS Semivolatiles

Tot Comple # . D2T020210-001	Work Order #:	EV.TEN/1 ΔΔ	Matrix: WG
Lot-Sample #: D3I030310-001	Date Received:		MICHAEL MC
Date Sampled: 09/02/03			
Prep Date: 09/07/03	Analysis Date:		
Prep Batch #: 3250094	Analysis Time:	12:55	
Dilution Factor: 1	M-41-4	GW046 0070	G GTV
	Method:	SW846 82/0	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	13	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	2.6 J	6.2	ng/L
Anthracene	4.2	4.2	ng/L
Benzo(a)anthracene	6.1	4.3	ng/L
Benzo (b) fluoranthene	6.0	4.7	ng/L
Benzo(k)fluoranthene	3.9 J	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	3.5 J	6.2	ng/L
Benzo(a) pyrene	5.6	2.5	ng/L
Benzo(e)pyrene	3.9 J	4.3	ng/L
Benzo(b) thiophene	8.1	5.2	ng/L
Biphenyl	0.97 J	5.6	ng/L
Carbazole	30	3.8	ng/L
Chrysene	5.1 J	5.6	ng/L
Dibenzo(a,h)anthracene	1.4 J	5.9	ng/L
Dibenzofuran	2.0 J	5.7	ng/L
Dibenzothiophene	1.5 J	4.1	ng/L
2,3-Dihydroindene	19	5.0	ng/L
Fluoranthene	18	4.6	ng/L
Fluorene	5.6	4.1	ng/L
Indene	4.0 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	3.7 J	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	5.3 J	5.9	ng/L
1-Methylnaphthalene	4.7 J	5.6	ng/L
Naphthalene	11	8.6	ng/L
Perylene	1.3 J	3.3	ng/L
Phenanthrene	21	6.3	ng/L
Pyrene	19	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	12 *	(30 - 118)	
Fluorene d-10	54	(41 - 162)	
Naphthalene-d8	40	(30 - 108)	

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W33FB-090203

# GC/MS Semivolatiles

Lot-Sample #: D3I030310-002	Work Order #: FXJFW1AA	Matrix WG
Date Sampled: 09/02/03	Date Received: 09/03/03	
Prep Date: 09/07/03	Analysis Date: 10/02/03	
Prep Batch #: 3250094	Analysis Time. : 13:33	

Dilution Factor: 1

Method....: SW846 8270C SIM

•		REPORTIN	G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	1.2 J	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	1.3 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	1.3 J	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	3.1 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	ND	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	<del>_</del>
Chrysene-d12	53	(30 - 118	•
Fluorene d-10	48	(41 - 162	•
Naphthalene-d8	45	(30 - 108	3}

J Estimated result. Result is less than RL.

# Client Sample ID: W33FBD-090203

# GC/MS Semivolatiles

Tab Comple 4 Paragona and	Wash only !		Mahada Ma
Lot-Sample #: D31030310-003	Work Order #:		Matrix WG
Date Sampled: 09/02/03	Date Received:		
Prep Pate: 09/07/03	Analysis Date:		
Prep Batch #: 3250094 Dilution Factor: 1	Analysis Time:	14:11	
Dilution Factor: 1	WLL_3	CHO 4 6 0070	O GTM
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e) pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	ND	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	1.2 J	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	1.4 J	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	3.3 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.1 J	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	62	(30 - 118)	
Fluorene d-10	48	(41 - 162)	
Naphthalene-d8	47	(30 - 108)	
	<del></del>	/20 - TOD)	

NOTE (S):

I Estimated result. Result is less than RL.

# Client Sample ID: W24-090203

# GC/MS Semivolatiles

Lot-Sample #:	D3I030310-004	Work Order #:	FXJF11AA	Matrix WG
---------------	---------------	---------------	----------	-----------

 Date Sampled...:
 09/02/03
 Date Received...:
 09/03/03

 Prep Date....:
 09/07/03
 Analysis Date...:
 10/02/03

 Prep Batch #...:
 3250094
 Analysis Time...:
 14:48

Dilution Factor: 1

Method.....: SW846 8270C SIM

		REPORTIN	G
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	19	5.7	ng/L
Acenaphthylene	1.4 J	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	4.0 J	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	1.2 J	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b)thiophene	2.3 J	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	2.3 J	3.8	ng/L
Chrysene	NTD	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
Fluoranthene	1.5 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	7.2	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	ND	4.7	ng/L
2-Methylnaphthalene	2.9 J	5.9	ng/L
1-Methylnaphthalene	2.3 J	5.6	ng/L
Naphthalene	6.5 J	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	2.2 J	6.3	ng/L
Pyrene	2.7 J	4.2	ng/L
Ouinoline	ND	9.0	ng/L
<del>-</del>	<del></del>	<del>.</del> . <del>.</del>	-3.
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	16 *	(30 - 11)	8)
Fluorene d-10	35 *	(41 - 162	
Naphthalene-d8	37	(30 - 10)	

<sup>\*</sup> Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W24-090203

# GC/MS Semivolatiles

Lot-Sample #: D31030310-004 Date Sampled: 09/02/03 Prep Date: 09/07/03 Prep Batch #: 3250094 Dilution Factor: 2	Work Order #: Date Received: Analysis Date: Analysis Time:	09/03/03 10/02/03	Matrix: WG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
2,3-Dihydroindene	190	10	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	17 *	(30 - 118)	
Fluorene d-10	36 *	(41 - 162)	
Naphthalene-d8	42	(30 - 108)	
NOTE(S):			

<sup>\*</sup> Surrogate recovery is outside stated control limits.

# Client Sample ID: W410-090203

# GC/MS Semivolatiles

Lot-Sample #: D3I030310-005	Work Order #: FXJF41AA	<b>Matrix</b> : WG
Date Sampled: 09/02/03	Date Received: 09/03/03	
Prep Date: 09/07/03	Analysis Date: 10/02/03	
Prep Batch #: 3250094	Analysis Time: 15:26	
Dilution Factor: 1		

Method....: SW846 8270C SIM

		REPORTING	
PARAMETER	RESULT	LIMIT	UNIT
Acenaphthylene	94	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	15	4.2	ng/L
Benzo(a)anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k)fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	4_8 J	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Biphenyl	.96	5.6	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	140	5.7	ng/L
Dibenzothiophene	10	4.1	ng/L
luoranthene	10	4.6	ng/L
luorene	150	4.1	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	4.5 J	4.7	ng/L
-Methylnaphthalene	ND	5.9	ng/L
aphthalene	41	8.6	ng/L
Perylene	ND	3.3	ng/L
henanthrene	150	6.3	ng/L
Pyrene	5.4	4.2	ng/L
Quinoline	7.5 J	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	-
Chrysene-d12	19 *	(30 - 118)	
Fluorene d-10	49	(41 - 162)	
Naphthalene-d8	42	(30 - 108)	

NOTE(S):
<ul> <li>Surrogate recovery is outside stated control limits.</li> </ul>

J Estimated result. Result is less than RL.

Client Sample ID: W410-090203

# GC/MS Semivolatiles

Lot-Sample #: D3I030310-005 Date Sampled: 09/02/03 Prep Date: 09/07/03 Prep Batch #: 3250094	Work Order #: Date Received: Analysis Date: Analysis Time:	09/03/03 10/02/03	Matrix WG
Dilution Factor: 10			
	Method:	SW846 8270	OC SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	310	57	ng/L
Benzo(b)thiophene	360	52	ng/L
Carbazole	150	38	ng/L
2,3-Dihydroindene	910	50	ng/L
Indene	810	47	ng/L
1-Methylnaphthalene	490	56	ng/L

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	NC, DIL	(30 - 118)
Fluorene d-10	NC, DIL	(41 - 162)
Naphthalene-d8	NC, DIL	(30 - 108)

 $NC\,$  The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W410D-090203

# GC/MS Semivolatiles

Lot-Sample #: D3I030310-006 Date Sampled: 09/02/03 Prep Date: 09/07/03 Prep Batch #: 3250094 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method	09/03/03 10/02/03 17:19	Matrix: WG
		#	
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthylene	100	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	17	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Biphenyl	110	5.6	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzothiophene	12	4.1	ng/L
Fluoranthene	11	4.6	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	5.9	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
Naphthalene	52	8.6	ng/L
Perylene	ND	3.3	ng/L
Pyrene	5.6	4.2	ng/L
Quinoline	10	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	25 *	(30 - 118)	
Fluorene d-10	65	(41 - 162)	
Naphthalene-d8	50	(30 - 108)	

<sup>\*</sup> Surrogate recovery is outside stated control limits.

# Client Sample ID: W410D-090203

# GC/MS Semivolatiles

Acenaphthene	350	57	ng/L
PARAMETER	RESULT	LIMIT	UNITS
		REPORTING	
	Method	: SW846 8270	C SIM
Dilution Factor: 10			
Prep Batch #: 3250094	Analysis Time	: 21:18	
<b>Prep Date:</b> 09/07/03	Analysis Date		
Date Sampled: 09/02/03	Date Received	: 09/03/03	
Lot-Sample #: D3I030310-00	6 Work Order #	: FXJF72AA	Matrix WG

Acenaphthene	350	57	ng/L	
Benzo(b) thiophene	420	<b>52</b>	ng/L	
Carbazole	150	38	ng/L	
Dibenzofuran	150	5 <b>7</b>	ng/L	
2,3-Dihydroindene	1100	50	ng/L	
Fluorene	160	41	ng/L	
Indene	940	47	ng/L	
1-Methylnaphthalene	570	56	ng/L	
Phenanthrene	170	63	ng/L	
	PERCENT	RECOVE	КХ	
SURROGATE	RECOVERY	LIMITS		
Chrygene_d12	NC DIL	/30 - 1	1101	

	FUNCUMI	ICHCO A DICI
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	NC, DIL	(30 - 118)
Fluorene d-10	NC, DIL	(41 - 162)
Naphthalene-d8	NC, DIL	(30 - 108)

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W23-090203

# GC/MS Semivolatiles

Lot-Sample #: D3I030310-007	Work Order #:	FXJGC1AA	Matrix: WG
Date Sampled: 09/02/03	Date Received:	09/03/03	
Prep Date: 09/07/03	Analysis Date:	10/02/03	
Prep Batch #: 3250094	Analysis Time:	17:57	
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Benzo(b) fluoranthene	52	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	2.0 J	6.2	ng/L
Benzo(a) pyrene	36	2.5	ng/L
Benzo(e)pyrene	17	4.3	ng/L
Dibenzo(a,h)anthracene	1.2 J	5.9	ng/L
Indene	98	4.7	ng/L
Indeno(1,2,3-cd)pyrene	2.5 J	5.4	ng/L
Indole	ND	4.7	ng/L
Perylene	6.1	3.3	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	24 *	(30 - 118)	
Fluorene d-10	112	(41 - 162)	

(30 - 108)

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# NOTE(S):

Naphthalene-d8

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

# Client Sample ID: W23-090203

## GC/MS Semivolatiles

Lot-Sample #...: D3I030310-007 Work Order #...: FXJGC2AA Matrix.....: WG

10C-3dmple #: D31030310-007	MOIR OIGET #:		PACLIA
Date Sampled: 09/02/03	Date Received:		
Prep Date: 09/07/03	Analysis Date:		
Prep Batch #: 3250094	Analysis Time:	21:55	
Dilution Factor: 25			
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
cenaphthene	4500	140	ng/L
cenaphthylene	240	120	ng/L
Acridine	300	160	ng/L
Anthracene	240	100	ng/L
Benzo(a)anthracene	180	110	ng/L
Benzo (b) thiophene	160	130	ng/L
Biphenyl	610	140	ng/L
Carbazole	210	95	ng/L
<b>I</b> hrysene	240	140	ng/L
Dibenzofuran	1200	140	ng/L
Dibenzothiophene	300	100	ng/L
2,3-Dihydroindene	910	120	ng/L
<b>Fluoranthene</b>	1600	120	ng/L
Pluorene	2900	100	ng/L
2-Methylnaphthalene	1100	150	ng/L
l-Methylnaphthalene	1600	140	ng/L
Naphthalene	4500	220	ng/L
Phenanthrene	1300	160	ng/L
Pyrene	1600	100	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 118)	
Fluorene d-10	NC, DIL	(41 - 162)	
Naphthalene-d8	NC, DIL	(30 - 108)	

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: SLP10-090203

# GC/MS Semivolatiles

Lot-Sample #: D3I030310-008	Work Order #: FXJGE1AA	Matrix WG
Date Sampled: 09/02/03	Date Received: 09/03/03	
Prep Date: 09/07/03	Analysis Date: 10/02/03	
Prep Batch #: 3250094	Analysis Time: 18:35	
Dilution Factor: 1		
	Method: SW846 8270C	SIM

		REPORTING			
PARAMETER	RESULT	LIMIT	UNITS		
Acenaphthylene	74	4.8	ng/L		
Acridine	3.4 J	6.2	ng/L		
Anthracene	7.2	4.2	ng/L		
Benzo (a) anthracene	1.5 J	4.3	ng/L		
Benzo(b) fluoranthene	ND	4.7	ng/L		
Benzo(k) fluoranthene	NTD	4.1	ng/L		
2,3-Benzofuran	ND	5.4	ng/L		
Benzo(ghi)perylene	ND	6.2	ng/L		
Benzo(a) pyrene	ND	2.5	ng/L		
Benzo(e)pyrene	ND	4.3	${\tt ng/L}$		
Benzo(b) thiophene	41	5.2	ng/L		
Biphenyl	15	5.6	ng/L		
Carbazole	26	3.8	ng/L		
Chrysene	0.99 J	5.6	ng/L		
Dibenzo(a,h)anthracene	ND	5.9	ng/L		
Dibenzofuran	54	5.7	ng/L		
Dibenzothiophene	18	4.1	ng/L		
Fluoranthene	28	4.6	ng/L		
Indene	56	4.7	ng/L		
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L		
Indole	4.3 J	4.7	ng/L		
2-Methylnaphthalene	1.4 J	5.9	ng/L		
1-Methylnaphthalene	85	5.6	ng/L		
Naphthalene	7.5 J	8.6	ng/L		
Perylene	ND	3.3	ng/L		
Phenanthrene	17	6.3	ng/L		
Pyrene	53	4.2	ng/L		
Quinoline	5.7 J	9.0	ng/L		
	PERCENT	RECOVERY			
SURROGATE	RECOVERY	LIMITS	LIMITS		
Chrysene-d12	26 *	(30 - 11	(30 - 118)		
Fluorene d-10	46	(41 - 16	2)		
Naphthalene-d8	42	(30 - 10	(30 - 108)		

Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

## Client Sample ID: SLP10-090203

## GC/MS Semivolatiles

Lot-Sample #: D3I030310-008 Date Sampled: 09/02/03 Prep Date: 09/07/03 Prep Batch #: 3250094 Dilution Factor: 10	Work Order #: Date Received: Analysis Date: Analysis Time:	09/03/03 10/02/03	Matrix: WG
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	500	57	ng/L
2,3-Dihydroindene	210	50	ng/L
Fluorene	130	41	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 118)	
Fluorene d-10	NC, DIL	(41 - 162)	
Naphthalene-d8	NC, DIL	(30 - 108)	
NOTE(S):			

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

## QC DATA ASSOCIATION SUMMARY

## D3I030310

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3250094	3250007
002	WG	SW846 8270C SIM		3250094	3250007
003	WG	SW846 8270C SIM		3250094	3250007
004	WG	SW846 8270C SIM		3250094	3250007
005	WG	SW846 8270C SIM		3250094	3250007
006	WG	SW846 8270C SIM		3250094	3250007
007	WG	SW846 8270C SIM		3250094	3250007
800	WG	SW846 8270C SIM		3250094	3250007

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Work Order #...: FXRVN1AA

Client Lot #...: D3I030310

MB Lot-Sample #: D3I070000-094

Prep Date....: 09/07/03

Matrix....: WATER

Analysis Date..: 10/02/03

Dilution Factor: 1

Prep Batch #...: 3250094

Analysis Time..: 11:39

		REPORTI	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo(a) pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b) thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ND	3.8	${\tt ng/L}$	SW846 8270C SIM
hrysene	ND	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	ND	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	ND	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	•			
	PERCENT	RECOVER	Y	
SURROGATE	RECOVERY	<u>LIMITS</u>		
Chrysene-dl2	44	(30 - 13		
Fluorene d-10	39 +	(41 - 16	•	
Naphthalene-d8	41	(30 - 10	08)	

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

<sup>\*</sup> Surrogate recovery is outside stated control limits.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3I030310 Work Order #...: FXRVN1AC Matrix.....: WATER

LCS Lot-Sample#: D3I070000-094

 Prep Date.....: 09/07/03
 Analysis Date..: 10/02/03

 Prep Batch #...: 3250094
 Analysis Time..: 12:17

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	60	(30 - 150)	SW846 8270C SIM
Chrysene	61	(30 - 132)	SW846 8270C SIM
Fluorene	59	(30 - 132)	SW846 8270C SIM
Indene	48	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	51	(30 - 150)	SW846 8270C SIM
Naphthalene	59	(30 - 150)	SW846 8270C SIM
Quinoline	58	(30 - 150)	SW846 8270C SIM
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12	•	66	(30 - 118)
Fluorene d-10		46	(41 - 162)
Naphthalene-d8		49	(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE DATA REPORT

### GC/MS Semivolatiles

Client Lot #...: D3I030310 Work Order #...: FXRVN1AC Matrix..... WATER

LCS Lot-Sample#: D3I070000-094

 Prep Date.....: 09/07/03
 Analysis Date..: 10/02/03

 Prep Batch #...: 3250094
 Analysis Time..: 12:17

Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
Benzo(e)pyrene	10.0	5.96	ng/L	60	SW846 8270C S
Chrysene	10.0	6.11	ng/L	61	SW846 8270C S
Fluorene	10.0	5.87	ng/L	59	SW846 8270C S
Indene	10.0	4.85	ng/L	48	SW846 B270C S
2-Methylnaphthalene	10.0	5.12	ng/L	51	SW846 8270C S
Naphthalene	10.0	5.92	ng/L	5 <b>9</b>	SW846 8270C S
Quinoline	10.0	5.85	ng/L	58	SW846 8270C S
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS	_	
Chrysene-d12		66	(30 - 118)	-	
Fluorene d-10		46	(41 - 162)		

49

(30 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Naphthalene-d8

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3I030310 Work Order #...: FXJF41AC-MS Matrix..... WG

MS Lot-Sample #: D3I030310-005 FXJF41AD-MSD

 Date Sampled...:
 09/02/03
 Date Received...:
 09/03/03

 Prep Date.....:
 09/07/03
 Analysis Date...:
 10/02/03

 Prep Batch #...:
 3250094
 Analysis Time...:
 16:04

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo (e) pyrene	0.0 a	(30 - 150)	<u></u>		SW846 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
Chrysene	21 a	(30 - 132)			SW846 8270C SIM
-	18 a	(30 - 132)	25	(0-50)	SW846 8270C SIM
Fluorene	461 a	(30 - 132)			SW846 8270C SIM
	475 a	(30 - 132)	0.77	(0-50)	SW846 8270C SIM
Indene	1080 a	(30 - 150)			SW846 8270C SIM
	1010 a	(30 ~ 150)	1.4	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	58	(30 - 150)	·		SW846 8270C SIM
	57	(30 - 150)	6.9	(0-50)	SW846 8270C SIM
Naphthalene	126	(30 - 150)			SW846 8270C SIM
	116	(30 - 150)	3.3	(0-50)	SW846 8270C SIM
Quinoline	33	(30 - 150)			SW846 8270C SIM
	24 a	(30 - 150)	10	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12		23 *		(30 - 118	)
		20 *		(30 - 118	)
Fluorene d-10		57		(41 - 162	<b>&gt;</b>
		57		(41 - 162	)
Naphthalene-d8		46		(30 - 108	)
		43		(30 - 108	)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

<sup>·</sup> Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3I030310 Work Order #...: FXJF41AC-MS Matrix...... WG

MS Lot-Sample #: D3I030310-005 FXJF41AD-MSD

 Date Sampled...:
 09/02/03
 Date Received..:
 09/03/03

 Prep Date....:
 09/07/03
 Analysis Date..:
 10/02/03

 Prep Batch #...:
 3250094
 Analysis Time..:
 16:04

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT				
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHO	D	
Benzo(e)pyrene	ND	10.4	0.0	ng/L	0.0 a		SW846	8270C	SIM
	ND	9.77	0.0	ng/L	0.0 a	0.0	SW846	8270C	SIM
Chrysene	ND	10.4	2.21	ng/L	21 a		SW846	8270C	SIM
<del>-</del>	ND	9.77	1.71	ng/L	18 a	25	SW846	8270C	SIM
Fluorene	150	10.4	1 <b>9</b> 5	ng/L	461 a		SW846	8270C	SIM
	150	9.77	194	ng/L	475 a	0.77	SW846	8270C	SIM
Indene	870	10.4	979	ng/L	1080 a		SW846	8270C	SIM
•	870	9.77	966	ng/L	1010 a	1.4	SW846	8270C	SIM
2-Methylnaphthalene	ND	10.4	6.02	ng/L	58		SW846	8270C	SIM
	ND	9.77	5.61	ng/L	57	6.9	SW846	8270C	SIM
Naphthalene	41	10.4	54.1	ng/L	126		SW846	8270C	SIM
_	41	9.77	52.4	ng/L	116	3.3	SWB46	8270C	SIM
Quinoline	7.5	10.4	10.9	ng/L	33		SW846	8270C	SIM
	7.5	9.77	9.85	ng/L	24 a	10	SW846	8270C	SIM
	<i>::</i>	PJ	ERCENT		RECOVERY				
SURROGATE		RI	ECOVERY		LIMITS				

	PERCENT	KECOVEKI
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	23 *	(30 - 118)
	20 *	(30 - 118)
Fluorene d-10	57	(41 - 162)
	57	(41 - 162)
Naphthalene-d8	46	(30 - 108)
	43	(30 - 108)

## NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

<sup>\*</sup> Surrogate recovery is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

## Chain of Custody Record

# 23/24/22/21/28



## Severn Trent Laboratories, Inc.

STL-4124 (0901)	·- · · · · · · · · · · · · · · · · · ·																				
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Stilouis Park MW State Zip	53 <sup>2</sup> 416	Site Col	ntact		-	Ú	)Con	tact 5	tri	ngei	_	Ţ	1 1	Anai more	ysis (/ space	Attach is ne	list if eded)	1 1	_		
Project Name and Location (State)		Carrier/	Waybill	Numb	er					<del></del>		7								Special I	nstructions/
Contract/Purchase Order/Quote No.				Matri	x			Cont. Prese				8								Condition	s of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Sed	Sosi	Unpres	H2SO4	HNO3	Ž	NaOH	Na OF	#7%									
W33 -090203	9203	1115	?	1		6						X									
W 33FB -090203		1055		Ш		$\perp \!\!\! \perp$						$\coprod$							$\perp$	(OA)	<del> </del>
W33FBD -090203		1100	$\perp \downarrow$			$\coprod$					$\perp$	$\perp \! \! \! \! \! \! \! \! \! \! \! \perp$									205-75
W24 -090203	4	1345	_1	4		1						<b>V</b>		$\downarrow \downarrow$	↓_				$\perp$		YI .
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Possible Hazard Identification			San	nple Dis	sposai	Ц			l					<u> </u>							
₹ Non-Hazard ☐ Flammable ☐ Skin Irritant	Poison B	] Unknown		•	•	ent		Dispos					hive For		_ Mon			nay be han 1 r		sed if samples are	retained
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## Chain of Custody Record



## Severn Trent Laboratories, Inc.

STL-4124 (0901)																							
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HSTRIBUTION: WHITE - Returned to Client with Report: CANARY - Stays with the Sample; PINK - Field Copy



## **FULL VALIDATION**

STL Project # D3I030310 (U)

March 9, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

Full validation was performed on the data for the analyses of six aqueous samples and two field blanks for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on September 2, 2003 at the City of St. Louis Park Reilly Tar site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL-Denver) in Arvada, CO for analysis. STL processed and reported the results under lot number D3I030310.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar and Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

Sample IDs	Sample IDs
W33-090203	W33FB-090203 (field blank)
W33FBD-090203 (field blank duplicate)	W24-090203
W410-090203	W410D-090203 (field duplicate of W410-090203)
W23-090203	SLP10-090203

## **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Initial and continuing calibrations
- Method blanks/field blanks
- Surrogate spike recoveries
- Internal standard performance
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results



- Compound quantitation
- Quantitation limits and sample results

## **DISCUSSION**

## **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

## **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory met the acceptance criteria of 4°C ± 2°C.

## **Initial and Continuing Calibrations**

The percent relative standard deviations (%RSDs) and the response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration associated with all sample analyses.

The percent differences (%Ds) were within the QC acceptance criteria in the continuing calibration associated with all sample analyses.

It should be noted that one sample (SLP10-090203 – 10x dilution) was analyzed nine minutes after the 12 hour continuing calibration clock. No action was taken on the basis of this minor nonconformance.

### Method Blanks/Field Blanks

Target analytes were not detected in the laboratory method blank. Target analytes were detected in both the field blank (W33FB-090203) and the field blank duplicate (W33FBD-090203). Detected concentrations are summarized in the table below. Per Region 5 guidance, no action was taken on this basis.

Blank ID	Analyte	Concentration (ng/L)
W33FB-090203	Anthracene	1.2
W33FB-090203	Indene	1.3
W33FB-090203	2-Methylnaphthalene	1.3
W33FB-090203	Naphthalene	3.1
W33FBD-090203	Indene	1.2
W33FBD-090203	2-Methylnaphthalene	1.4
W33FBD-090203	Naphthalene	3.3
W33FBD-090203	Phenanthrene	1.1



## **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses with the exception of those tabulated below.

Sample ID	Surrogate	%R	QC Limits (%R)
W33-090203	Chrysene-d <sub>12</sub>	12	30 – 118
W24-090203	Chrysene-d <sub>12</sub>	16	30 – 118
W24-090203	Fluorene-d <sub>10</sub>	35	41 - 162
W24-090203 (2x dil)	Chrysene-d <sub>12</sub>	17	30 – 118
W24-090203 (2x dil)	Fluorene-d <sub>10</sub>	36	41 - 162
W410-090203	Chrysene-d <sub>12</sub>	19	30 – 118
W410D-090203	Chrysene-d <sub>12</sub>	25	30 – 118
W23-090203	Chrysene-d <sub>12</sub>	24	30 – 118
SLP10-090203	Chrysene-d <sub>12</sub>	26	30 – 118

Detected and non-detected results in sample W24-090203 were qualified as estimated (J/UJ). No action was taken on the results from the other samples since only one of three surrogates was outside of the acceptance limits. It should also be noted that surrogates were diluted out of the 10x dilutions of samples W410-090203, W410D-0902030, and SLP10-090203, and the 25x dilution of W23-090203. No action was required on this basis.

#### **Internal Standard Performance**

The internal standard performance was within the QC acceptance criteria of 50 - 200% in all sample analyses with the exception of perylene- $d_{12}$  (220%) in sample W33-090203. Detected results reported for analytes quantitated with this internal standard were qualified as estimated (J). Non-detected results were accepted unqualified since the nonconformance suggests a positive bias.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

### MS/MSD Results

MS/MSD analyses were performed on sample W410-090203. All relative percent differences (RPDs) met the acceptance criteria. The following table summarizes the percent recoveries of the spiked target analytes which fell outside the QC acceptance limits. The non-detected results for benzo(e)pyrene in the native sample W410-090203 and its duplicate W410D-090203 were rejected (R) since the compound did not recover in the MS/MSD analyses. The detected and non-detected results for chrysene and quinoline were qualified as estimated (J/UJ) in these samples.



Compound	%R MS/MSD	QC Limits
Chrysene	21/18	30 - 132
Benzo(e)pyrene	0/0	30 - 150
Quinoline	33/24	30 - 150

## **Field Duplicate Results**

Samples W410-090203 and W410D-090203 were submitted as the field duplicate samples with this data set. Detected analytes and associated RPDs are tabulated below. All RPDS met the acceptance criteria or were not calculable (NC) due to a non-detect result in either the sample or the duplicate. Precision was deemed acceptable.

Analyte	Original		RPD
	(ng/L)	(ng/L)	
1-Methylnaphthalene	490	570	15.1
2,3-Benzofuran	4.8 J	5.4 U	NC
2,3-Dihydroindene	910	1100	18.9
Acenaphthene	310	350	12.1
Acenaphthylene	94	100	6.2
Anthracene	15	17	12.5
Benzo(b)thiophene	360	420	15.4
Biphenyl	96	110	13.6
Carbazole	150	150	0
Dibenzofuran	140	150	6.9
Dibenzothiophene	10	12	18.2
Fluoranthene	10	11	9.5
Fluorene	150	160	6.5
Indene	810	940	14.9
Indole	4.5 J	5.9	26.9
Naphthalene	41	52	23.7
Phenanthrene	150	170	12.5
Pyrene	5.4	5.6	3.6
Quinoline	7.5 J	10	28.6

## **Compound Quantitation**

Sample results were spot-checked. No discrepancies were noted.

## **Quantitation Limits and Sample Results**

All samples were initially analyzed undiluted, and all non-detects are reported from the undiluted run. Sample quantitation limits (SQLs) were therefore not affected. Several samples required an additional diluted analysis as tabulated below due to target compound concentrations that exceeded the calibration range in the undiluted analysis.



Sample ID	Dilution
W24-090203	2x
W410-090203	10x
W410D-090203	10x
W23-090203	25x
SLP10-090203	10x

Sample quantitation limits were adjusted accordingly. The laboratory reported results from the most appropriate run.

The laboratory's reporting limits were compared with those specified in the QAPP. All laboratory limits were met the required reporting limits with the following exceptions:

Analyte	Laboratory Reporting Limit (ng/L)	QAPP Reporting Limit (ng/L)
Phenanthrene	6.3	4.7
Anthracene	4.2	3.4
Benzo(k)fluoranthene	4.1	3.9

No action was taken other than this notation.





**STL Denver** 4955 Yarrow Street Arvada, CO 80002

ANALYTICAL REPORT

Tel: 303 736 0100 Fax: 303 431 7171 www.stl-inc.com

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3J220273

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Gail DeRuzzo Project Manager

December 10, 2003

## **Table Of Contents**

## Standard Deliverables with Supporting Documentation

Report Contents	Number of Pages
Standard Deliverables (The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)	
<ul> <li>Table of Contents</li> <li>Case Narrative</li> <li>Executive Summary – Detection Highlights</li> <li>Methods Summary</li> <li>Method/Analyst Summary</li> <li>Lot Sample Summary</li> <li>Analytical Results</li> <li>QC Data Association Summary</li> <li>Chain-of-Custody</li> </ul>	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section,).  • Volatile GC/MS	Check below when supporting documentation is present.
Semivolatile GC/MS	
Volatile GC	
Semivolatile GC	
• LC/MS or HPLC	
• Metals	
General Chemistry	
• Subcontracted Data	

## CASE NARRATIVE D3J220273

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Four samples were received under chain of custody on October 22, 2003. The samples were received in good condition at temperatures of 3.1, 2.0, and 2.6°C.

## GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

The analytes Naphthalene and Phenanthrene were detected in the Method Blank below the reporting limit. No corrective action is taken for values detected in the method blanks below the reporting limits.

The LCS demonstrated recovery below the control limits for Quinoline. Quinoline has historically shown very poor and erratic recoveries. The holding time had expired and insufficient sample volume remains for re-extraction of samples. Quinoline results should be considered biased low.

The MS/MSD performed on sample D3J220273-002 demonstrated recoveries that were below the control limits for Benzo(e)pyrene and Quinoline. Additionally, the relative percent difference for Benzo(a)pyrene was outside control limits. These anomalies may be due to matrix interference.

Samples D3J220273-002 and 002MS failed the internal standard recovery criteria for Perylene-d12. Matrix effects are suspected.

Detections in the Field Blank are less than the reporting limit.

No other anomalies were observed.

## Data Completeness for Method 8270C SIM

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLET	ENESS CALC	ULATION			
	D3J220273				
ANALYSIS:	S: SW846-8270C SIM				
QC Parameter	Data Planned	Valid Data Obtained			
Method Blank	31	29			
MB Surrogates	3	3			
LCS	7	6			
LCS Surrogates	3	3			
FB/FBD	31	31			
MS	7	5			
MS Surrogates	3	3			
MSD	7	5			
MSD Surrogates	3	3			
MS/MSD RPD	7	6			
Sample/Dup. RPD	31	31			
Sample Surrogates	12	12			
Samples and QC	24	22			
Internal Standard Area					
TOTAL	169	159			

<sup>\*</sup>A MS/MSD was performed on sample W119-102103.

## Sample Duplicate Calculation for Method 8270C SIM

Sample Duplicate RPD					
LOT D3J220273					
Sample: W119- 102103		DUP: W119D-102103			
Compound	Result	Compound	Result	RPD	RPD>50%
Acenaphthene	64	Acenaphthene	69	7.5	
Acenaphthylene	4.7	Acenaphthylene	4.6	2.2	
Acridine	31 .	Acridine	36	14.9	
Anthracene	6.8	Anthracene	6.7	1.5	
Benzo(a)anthracene	0.99	Benzo(a)anthracene	ND	NC	<u> </u>
Benzo(b)fluoranthene	ND	Benzo(b)fluoranthene	ND	0.0	
Benzo(k)fluoranthene	ND	Benzo(k)fluoranthene	ND	0.0	
2,3-Benzofuran	ND	2,3-Benzofuran	ND .	0.0	
Benzo(ghi)perylene	ND	Benzo(ghi)perylene	ND	0.0	
Benzo(a)pyrene	ND	Benzo(a)pyrene	ND	0.0	
Benzo(e)pyrene	ND	Benzo(e)pyrene	ND	0.0	
Benzo(b)thiophene	7.3	Benzo(b)thiophene	7.6	4.0	
Biphenyl	ND	Biphenyl	ND	0.0	
Carbazole	3.9	Carbazole	3.9	0.0	
Chrysene	ND .	Chrysene	ND	0.0	
Dibenz(a,h)anthracen e	ND	Dibenz(a,h)anthracene	ND	0.0	
Dibenzofuran	1.1	Dibenzofuran	ND	NC	
Dibenzothiophene	ND	Dibenzothiophene	5.3	NC	
2,3-Dihydroindene	15	2,3-Dihydroindene	16	6.5	
Fluoranthene	9.7	Fluoranthene	9.9	2.0	
Fluorene	1.3	Fluorene	ND	NC	
Indene	11	Indene	12	8.7	
Indeno(1,2,3- cd)pyrene	ND	Indeno(1,2,3-cd)pyrene	ND	0.0	
Indole	1.9	Indole	1.7	11.1	
2-Methylnaphthalene	1.5	2-Methylnaphthalene	1.7	12.5	
1-Methylnaphthalene	1.5	1-Methylnaphthalene	1.6	6.5	
Naphthalene	2.2	Naphthalene	2.6	16.7	
Perylene	ND	Perylene	ND	0.0	
Phenanthrene	2.3	Phenanthrene	2.5	8.3	
Pyrene	14	Pyrene	14	0.0	1
Quinoline	ND	Quinoline	ND .	0.0	

RPD = Relative Percent Difference
ND = Compound not detected in the sample
p = RPD is outside of control limits
\*NC = RPD not calculated, one positive result and one ND. Considered acceptable if the positive result is less than 4x the RL.

## **EXECUTIVE SUMMARY - Detection Highlights**

D3J220273

		REPORTIN	_	ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
W48-102103 10/21/03 10:45 001				
Acenaphthene	63	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	2.8 J	4.8	ng/L	SW846 8270C SIM
Acridine	35	6.2	ng/L	SW846 8270C SIM
Anthracene	7.6	4.2	ng/L	SW846 8270C SIM
2,3-Benzofuran	1.4 J	5.4	ng/L	SW846 8270C SIM
Benzo(b)thiophene	7.3	5.2	ng/L	SW846 8270C SIM
Carbazole	3.5 J	3.8	ng/L	SW846 8270C SIM
Dibenzothiophene	4.7	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	11	5.0	ng/L	SW846 8270C SIM
Fluoranthene	3.0 J	4.6	ng/L	SW846 8270C SIM
Indene	19	4.7	ng/L	SW846 8270C SIM
Indole	2.3 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.5 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	1.9 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	2.5 J,B	8.6	ng/L	SW846 8270C SIM
Phenanthrene	2.5 J,B	6.3	ng/L	SW846 8270C SIM
Pyrene	6.0	4.2	ng/L	SW846 8270C SIM
W119-102103 10/21/03 15:00 002		•		
Acenaphthene	64	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	4.7 J	4.8	ng/L	SW846 8270C SIM
Acridine	31	6.2	ng/L	SW846 8270C SIM
Anthracene	6.8	4.2	ng/L	SW846 8270C SIM
Benzo(a) anthracene	0.99 J	4.3	ng/L	SW846 8270C SIM
Benzo(b)thiophene	7.3	5.2	ng/L	SW846 8270C SIM
Carbazole	3.9	3.8	ng/L	SW846 8270C SIM
Dibenzofuran	1.1 J	5.7	ng/L	SW846 B270C SIM
2,3-Dihydroindene	15	5.0	ng/L	SW846 8270C SIM
Fluoranthene	9.7	4.6	ng/L	SW846 8270C SIM
Fluorene	1.3 J	4.1	ng/L	SW846 8270C SIM
Indene	11	4.7	ng/L	SW846 8270C SIM
Indole	1.9 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.5 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	1.5 J	5.6	ng/L	SW846 8270C SIM
Naphthalene	2.2 J,B	8.6	ng/L	SW846 8270C SIM
Phenanthrene	2.3 J,B	6.3	ng/ <b>L</b>	SW846 8270C SIM
Pyrene	14	4.2	ng/L	SW846 8270C SIM

(Continued on next page)

## **EXECUTIVE SUMMARY - Detection Highlights**

D3J220273

PARAMETER W119D-102103 10/21/03 15:05 003	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
• •				
Acenaphthene	69	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	4.6 J	4.8	ng/L	SW846 8270C SIM
Acridine	36	6.2	ng/L	SW846 8270C SIM
Anthracene	6.7	4.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	7.6	5.2	ng/L	SW846 8270C SIM
Carbazole	3.9	3.8	ng/L	SW846 8270C SIM
Dibenzothiophene	5.3	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	16	5.0	ng/L	SW846 8270C SIM
Fluoranthene	9.9	4.6	ng/L	SW846 8270C SIM
Indene	12	4.7	ng/L	SW846 8270C SIM
Indole	1.7 J	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.7 J	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	1.6 J	5 <b>.6</b>	ng/L	SW846 8270C SIM
Naphthalene	2.6 J,B	8.6	ng/L	SW846 8270C SIM
Phenanthrene	2.5 J.B	6.3	ng/L	SW846 8270C SIM
Pyrene	14	4.2	ng/L	SW846 8270C SIM
W119FB-102103 10/21/03 15:30 004				
Fluoranthene	1.1 J	4.6	ng/L	SW846 8270C SIM
Indole	1.3 J	4.7	ng/L	SW846 8270C SIM
Naphthalene	1.4 J,B	8.6	ng/L	SW846 8270C SIM
Phenanthrene	1.2 J,B	6.3	ng/L	SW846 8270C SIM

## **METHODS SUMMARY**

## D3J220273

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

Base/Neutrals and Acids

SW846 8270C SIM SW846 3520C

References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## METHOD / ANALYST SUMMARY

## D3J220273

ANALYTIC METHOD	CAL	ANALYST	ANALYST ID
SW846 82	270C SIM	Tim O'Donnell	000443
Reference	ces:		
SW846		for Evaluating Solid Waste, Phys d Edition, November 1986 and its	

## SAMPLE SUMMARY

### D3J220273

<u>WO #</u>	Sample#	CLIENT SAMPLE ID	SAMPLED DATE	TIME
F26HC	001	W48-102103	10/21/03	
F26HK	002	W119-102103	10/21/03	15:00
F26HL	003	W119D-102103	10/21/03	15:05
F26HP	004	W119FB-102103	10/21/03	15:30

## NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

## Client Sample ID: W48-102103

## GC/MS Semivolatiles

Lot-Sample #: D3J220273-001 Date Sampled: 10/21/03 Prep Date: 10/27/03 Prep Batch #: 3300447 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time:	10/22/03 12/04/03	Matrix: WG
	Method:	SW846 8270	C SIM
		DEDOD#114	N.
PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	63	5.7	ng/L
Acenaphthylene	2.8 J	4.8	ng/L
Acridine	35	6.2	ng/L
Anthracene	7.6	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	1.4 J	5.4	ng/L
Benzo(ghi) perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo (b) thiophene	7.3	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	3.5 J	3.8	ng/L
Chrysene	ND	5.6	nq/L
Dibenzo (a, h) anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	4.7	4.1	nq/L
2,3-Dihydroindene	11	5.0	ng/L
Fluoranthene	3.0 Ј	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	19	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	2.3 Ј	4.7	ng/L
2-Methylnaphthalene	1.5 Ј	5.9	ng/L
1-Methylnaphthalene	1.9 Ј	5.6	ng/L
Naphthalene	2.5 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	2.5 J,B	6.3	ng/L
Pyrene	6.0	4.2	ng/L
Quinoline	ND	9.0	ng/L
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Chrysene-d12	52	(30 - 118)	

## NOTE(S):

Fluorene d-10

Naphthalene-d8

100

60

(41 - 162)

(30 - 108)

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: W119-102103

## GC/MS Semivolatiles

T . G . 7 . 11	wire		Martine and the second
Lot-Sample #: D3J220273-002			Matrix: WG
Date Sampled: 10/21/03	Date Received:	• •	
Prep Date: 10/27/03	Analysis Date:		
Prep Batch #: 3300447	Analysis Time:	19:56	
Dilution Factor: 1	Makhad	OM046 0076	O STM
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	64	5.7	ng/L
Acenaphthylene	4.7 J	4.8	ng/L
Acridine	31	6.2	ng/L
Anthracene	6.8	4.2	ng/L
Benzo(a) anthracene	0.99 J	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	62	ng/L
Benzo (a) pyrene	ND	2.5	ng/L
Benzo (e) pyrene	ND	4.3	ng/L
Benzo (b) thiophene	7.3	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	3.9	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	1.1 J	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	15	5.0	ng/L
Fluoranthene	9.7	4.6	ng/L
Fluorene	1.3 J	4.1	ng/L
Indene	11	4.7	ng/L
Indeno(1,2,3-cd)pyrene	MD	5.4	ng/L
Indole	1.9 Ј	4.7	ng/L
2-Methylnaphthalene	1.5 J	5.9	ng/L
1-Methylnaphthalene	1.5 J	5.6	ng/L
Naphthalene	2.2 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	2.3 J,B	6.3	ng/L
Pyrene	14	4.2	ng/L
Quinoline	ND	9.0	ng/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	-
Chrysene-d12	47	(30 - 118)	
Fluorene d-10	67	(41 - 162)	

(30 - 108)

## NOTE (S):

Naphthalene-d8

54

J Estimated result, Result is less than RL,

B Method blank communication. The associated method blank contains the target analyte at a reportable level.

(a) = 14

## Client Sample ID: W119D-102103

## GC/MS Semivolatiles

Lot-Sample #: D3J220273-003	Work Order #:	•	Matrix: WG
Date Sampled: 10/21/03	Date Received:		
Prep Date: 10/27/03	Analysis Date:		
Prep Batch #: 3300447	Analysis Time:	21:48	
Dilution Factor: 1			•
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	69	5.7	ng/L
Acenaphthylene	4.6 J	4.8	ng/L
Acridine	36	6.2	ng/L
Anthracene	6.7	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND ·	4.3	ng/L
Benzo(b) thiophene	7.6	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	3.9	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	5.3	4.1	ng/L
2,3-Dihydroindene	16	5.0	ng/L
Fluoranthene	9.9	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	12	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	1.7 Ј	4.7	ng/L
2-Methylnaphthalene	1.7 J	5.9	ng/L
1-Methylnaphthalene	1.6 Ј	5.6	ng/L

•	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-dl2	44	(30 ~ 118)
Fluorene d-10	70	(41 - 162)
Naphthalene-d8	53	(30 - 108)

2.6 Ј,В

2.5 J,B

ND

14

ND

8.6

3.3

6.3

4.2

9.0

ng/L

ng/L

ng/L

ng/L

ng/L

## NOTE(S):

Naphthalene

Phenanthrene

Perylene

Quinoline

Pyrene

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## Client Sample ID: W119FB-102103

## GC/MS Semivolatiles

T-+ G T- H	Wards Orders #	ECCUPANA	Matrix WG
Lot-Sample #: D3J220273-004	Date Received:		Mallilk WG
Date Sampled: 10/21/03			
Prep Date: 10/27/03	Analysis Date:		
Prep Batch #: 3300447	Analysis Time:	22:25	
Dilution Factor: 1	Trabbad	CM046 0070	G GTM
	Method:	5W646 82/U	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	ND	5.7	ng/L
Acenaphthylene	ND	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	ND	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a) pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	ND	5.2	ng/L
Biphenyl	ND .	5.6	ng/L
Carbazole	ND	3.8	ng/L
Chrysene	ND '	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	ND	4.1	ng/L
2,3-Dihydroindene	ND	5.0	ng/L
Fluoranthene	1.1 J	4.6	ng/L
Fluorene	ND	4.1	ng/L
Indene	ND	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	1.3 Ј	4.7	ng/L
2-Methylnaphthalene	ND	5.9	ng/L
1-Methylnaphthalene	ND	5.6	ng/L
Naphthalene	1.4 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	1.2 J,B	6.3	ng/L
Pyrene	ND	4.2	ng/L
Quinoline	ND	9.0	ng/L
-			-
•	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	_
Chrysene-d12	82	(30 - 118)	-
		/	

(41 - 162)

(30 - 108)

## NOTE (S):

Fluorene d-10

Naphthalene-d8

48

58

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## QC DATA ASSOCIATION SUMMARY

D3J220273

## Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3300447	3300236
002	WG	SW846 8270C SIM		3300447	3300236
003	WG	SW846 8270C SIM		3300447	3300236
004	WG	SW846 8270C SIM		3300447	3300236

55 - 17

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3J220273

Work Order #...: F3HCT1AA

Matrix....: WATER

MB Lot-Sample #: D3J270000-447

Prep Date....: 10/27/03 Prep Batch #...: 3300447 Analysis Time..: 16:50

Analysis Date..: 12/04/03

Dilution Factor: 1

REPORTING

PARAMETER	RESULT	LIMIT	UNITS	METHOD
Acenaphthene	ND	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	· ND	4.8	ng/L	SW846 8270C SIM
Acridine	ND	6.2	ng/L	SW846 8270C SIM
Anthracene	ND	4.2	ng/L	SW846 8270C SIM
Benzo (a) anthracene	ND	4.3	ng/L	SW846 8270C SIM
Benzo (b) fluoranthene	ND	4.7	ng/L	SW846 8270C SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846 8270C SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846 8270C SIM
Benzo (a) pyrene	ND	2.5	ng/L	SW846 8270C SIM
Benzo(e)pyrene	ND	4.3	ng/L	SW846 8270C SIM
Benzo(b)thiophene	ND	5.2	ng/L	SW846 8270C SIM
Biphenyl	ND	5.6	ng/L	SW846 8270C SIM
Carbazole	ИĎ	3.8	ng/L	SW846 8270C SIM
Chrysene	ND	5.6	ng/L	SW846 8270C SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846 8270C SIM
Dibenzofuran	ND	5.7	ng/L	SW846 8270C SIM
Dibenzothiophene	ND	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846 8270C SIM
Fluoranthene	ND	4.6	ng/L	SW846 8270C SIM
Fluorene	ND	4.1	ng/L	SW846 8270C SIM
Indene	ND	4.7	ng/L	SW846 8270C SIM
Indeno(1,2,3-cd)pyrene	ND .	5.4	ng/L	SW846 8270C SIM
Indole	ND	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846 8270C SIM
Naphthalene	1.1 J	8.6	ng/L	SW846 8270C SIM
Perylene	ND	3.3	ng/L	SW846 8270C SIM
Phenanthrene	1.5 J	6.3	ng/L	SW846 8270C SIM
Pyrene	ND	4.2	ng/L	SW846 8270C SIM
Quinoline	ND	9.0	ng/L	SW846 8270C SIM
	PERCENT	RECOVERY	ť	
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	94	(30 - 1	18)	•
Fluorene d-10	66	(41 - 16)	52)	
Naphthalene-d8	80	(30 - 10	08)	•

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

J Estimated result. Result is less than RL.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3J220273 Work Order #...: F3HCT1AC Matrix...... WATER

LCS Lot-Sample#: D3J270000-447

Prep Date....: 10/27/03 Analysis Date..: 12/04/03
Prep Batch #...: 3300447 Analysis Time..: 17:27

Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Benzo (e) pyrene	8 <b>4</b>	(30 - 150)	SW846 8270C SIM
Chrysene	78	(30 - 132)	SW846 8270C SIM
Fluorene	69	(30 - 132)	SW846 8270C SIM
Indene	<b>54</b>	(30 - 150)	SW846 8270C SIM
2-Methylnaphthalene	63	(30 - 150)	SW846 8270C SIM
Naphthalene	78	(30 - 150)	SW846 8270C SIM
Quinoline	0.0 a	(30 - 150)	SW846 8270C SIM
		PERCENT	RECOVERY
SURROGATE		RECOVERY	<u>LIMITS</u>
Chrysene-dl2		87	(30 - 118)
Fluorene d-10		61	(41 - 162)

65

(30 - 108)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Naphthalene-d8

a Spiked analyte recovery is outside stated control limits.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3J220273

Work Order #...: F3HCT1AC

Matrix....: WATER

LCS Lot-Sample#: D3J270000~447

Prep Date....: 10/27/03

Analysis Date..: 12/04/03

Prep Batch #...: 3300447 Analysis Time..: 17:27

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo(e)pyrene	10.0	8.35	ng/L	84	SW846 8270C S
Chrysene	10.0	7.77	ng/L	78	SW846 8270C S
Fluorene	10.0	6.89	ng/L	69	SW846 8270C S
Indene	10.0	5.45	ng/L	54	SW846 8270C S
2-Methylnaphthalene	10.0	6.34	ng/L	63	SW846 8270C S
Naphthalene	10.0	7.82	ng/L	78	SW846 8270C S
Quinoline	10.0	0.0 a	ng/L	0.0	SW846 8270C S

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-dl2	87	(30 - 118)
Fluorene d-10	61	(41 - 162)
Naphthalene-d8	65	(30 - 108)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3J220273 Work Order #...: F26HK1AC-MS Matrix.....: WG

MS Lot-Sample #: D3J220273-002 F26HK1AD-MSD

Date Sampled...: 10/21/03 Date Received..: 10/22/03
Prep Date....: 10/27/03 Analysis Date..: 12/04/03
Prep Batch #...: 3300447 Analysis Time..: 20:34

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo(e)pyrene	0.0 a	(30 - 150)			SW846 8270C SIM
	11 a,p	(30 - 150)	200	(0-50)	SW846 8270C SIM
Chrysene	43	(30 - 132)			SW846 8270C SIM
	49	(30 - 132)	16	(0-50)	SW846 8270C SIM
Fluorene	64	(30 - 132)			SW846 8270C SIM
	65	(30 - 132)	2.7	(0-50)	SW846 8270C SIM
Indene	34	(30 - 150)			SW846 8270C SIM
	53	(30 - 150)	1,2	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	45	(30 - 150)			SW846 8270C SIM
	52	(30 - 150)	12	(0-50)	SW846 8270C SIM
Naphthalene	53	(30 - 150)			SW846 8270C SIM
	66	(30 - 150)	17	(0-50)	SW846 8270C SIM
Quinoline	0.0 a	(30 - 150)			SWB46 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12	<u>—</u>	46		(30 - 118)	<u></u>
		52		(30 - 118)	)
Fluorene d-10		101		(41 - 162)	•
		65		(41 - 162)	)
Naphthalene-d8		45		(30 - 108)	)
		51	•	(30 - 108)	)

## NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

## MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3J220273 Work Order #...: F26HK1AC-MS Matrix.....: WG

MS Lot-Sample #: D3J220273-002 F26HKlAD-MSD

Date Sampled...: 10/21/03 Date Received..: 10/22/03

Prep Date....: 10/27/03 Analysis Date..: 12/04/03

Prep Batch #...: 3300447 Analysis Time..: 20:34

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo(e)pyrene	ND	9.63	0.0	ng/L	0.0 a		SW846 8270C SIM
	ND	9.78	1.03	ng/L	11 a,p	200	SW846 8270C SIM
Chrysene	ND	9.63	4.11	ng/L	43		SW846 8270C SIM
	ND	9.78	4.81	ng/L	49	16	SW846 8270C SIM
Fluorene	1.3	9.63	7.44	ng/L	64		SW846 8270C SIM
	1.3	9.78	7.65	ng/L	65	2.7	SW846 8270C SIM
Indene	11	9.63	14.5	ng/L	34		SW846 8270C SIM
•	1. <b>1</b> .	9.78	16.4	ng/L	53	12	SW846 8270C SIM
2-Methylnaphthalene	1.5	9.63	5.88	ng/L	45		SW846 8270C SIM
	1.5	9.78	6.62	ng/L	52	12	SW846 8270C SIM
Naphthalene	2.2	9.63	7.32	ng/L	53		SW846 8270C SIM
	2,2	9.78	8.65	ng/L	66	17	SW846 8270C SIM
Quinoline	ND	9.63	0.0	ng/L	0.0 a		SW846 8270C SIM
	ND	9.78	0.0	ng/L	0.0 a	0.0	SW846 8270C SIM

	PERCENT	LIMITS						
SURROGATE	RECOVERY							
Chrysene-d12	46	(30 - 118)						
44	52	(30 - 118)						
Fluorene d-10	101	(41 - 162)						
	65	(41 - 162)						
Naphthalene-d8	45	(30 - 108)						
	51	(30 - 108)						

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

## Chain of Custody Record

3.1° GA 2.0° 10-22 2.6°



STL Deriver 4955 Yarrow Street Arvada, CO 80002

STL-4124 (0901)			_																									
City of St. Louis Par	k	Project Manager Anders						on						Date /0 /21/0 3						•	Chain of Custody Number 289206							
3752 Wooddale Ave	_	Telephone Number (Area Code)/F					25	5	7		•			Leb Number									Page _	(	,	of		
	55416	Site Contact Save			Gail Defuzzo									7	Anal nore	nalysis (Attach list if ore space is needed)												
Project Name and Location (State)		Carrier/Waybill Number											PPTS											Specia	ai ins	tructio	ns/	
Contract/Purchase Order/Quote No.		Matrix				Containers & Preservatives																	Condit	ions d	of Red	eipt		
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	P\$	Aqueous	20 PG		Unpres.	H2SO4	HNO3	HCI	NaOH	ZPAC NBOH		を														
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W119-102103	1	500		$\coprod$	┸		Щ					Ш		Щ	$\bot$							$\perp$		0	/\L		<i> </i>	
W119D-102103	15	505		$\coprod$	$\perp$		Ш							Ш							$\perp$							
W119M5-102103	15	510		Ш	┸												$oldsymbol{\perp}$	L					L					
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Possible Hazard Identification	<u> </u>			•	Disposal										,_L			ــــــــــــــــــــــــــــــــــــــ	↓	(A fee		be as	LSSess	ed if sa	mples a	re reta	ined	
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Comments		<u> </u>		L		-	1		-					_														



#### **DATA QUALITY ASSESSMENT**

STL Project # D3J220273 (V)

March 9, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### **SUMMARY**

A data assessment was performed on the data for the analyses of four aqueous samples for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM. The samples were collected on October 21, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3J220273.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

W48-102103 W119-102103 W119D-102103 W119FB-102103

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

#### **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperatures upon receipt at the laboratory were between 2.0°C and 3.1°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### Method Blanks

There was one method blank for this data package, prep batch 3241187. There were two target analytes detected in the laboratory method blank. They were naphthalene and phenanthrene. There were four compounds detected in the field blank submitted for this data package. They were fluoranthene, indole, naphthalene, and phenanthrene. Each of the compounds were detected below the action levels.

#### **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

## **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses except for quinoline. Quinoline was detected at 0% and fell outside the control limits of 30-150.

#### MS/MSD Results

MS/MSD analyses were performed on sample W119-102103. The following table summarizes the percent recoveries and/or the relative percent differences (RPDs) of the spiked target analytes that fell outside the QC acceptance limits. The percent recovery for benzo(e)pyrene was 0% for the MS and 11 % for the MSD. Quinoline was not detected in either the MS or MSD. All other recoveries and RPDs were within the acceptable range.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	0/11	200	30-150/0-50
Quinoline	0/0	ok	30-150/0-50



## **Field Duplicate Results**

Sample W119-102103 was submitted as the field duplicate sample with this data set. The RPD calculations for these samples were within the acceptable range for the detected analytes. There were 19 out of 31 compounds detected with a RPD range of 0.0% to 16.7%.

## **Quantitation Limits and Sample Results**

All samples were analyzed undiluted. Sample quantitation limits (SQLs) were therefore not affected.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.

**W** 



STL Denver 4955 Yarrow Street Arvada, CO 80002

# ANALYTICAL REPORT

Tel: 303 736 0100 Fax: 303 431 7171 www.stl-inc.com

City of St. Louis Park

Project: Reilly Tar & Chemical Corporation

Lot #: D3K050301

Mr. Scott Anderson

City of St. Louis Park Utility Division 3752 Wooddale Avenue St. Louis Park, MN 55416

STL DENVER

Gail DeRuzzo Project Manager

December 22, 2003

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# Standard Deliverables with Supporting Documentation

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• Case Narrative	
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Method/Analyst Summary	. •
Lot Sample Summary	
Analytical Results	
QC Data Association Summary	•
• Chain-of-Custody	
Supporting Documentation (Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).	Check below when supporting documentation is present.
Volatile GC/MS	
Semivolatile GC/MS	/
Volatile GC	
•	·
Semivolatile GC	
Bennyolatile GC	
• LC/MS or HPLC	
LC/MS of HPLC	
a Madala	
• Metals	
Grand Character	
General Chemistry	
• Subcontracted Data	

## CASE NARRATIVE D3K050301

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

## Sample Receiving

Three samples were received under chain of custody on November 5, 2003. The samples were received in good condition at a temperature of 3.7°C.

## GC/MS Semivolatiles, Method SW846 8270C Full Scan

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold with the exceptions noted below.

Sample D3K050301-002 was analyzed at a 10-fold dilution to obtain 2,3-Dihydroindene within the calibration range and was analyzed at a 20-fold dilution to obtain Naphthalene within the calibration range. All other analytes for this sample are reported from the undiluted analysis with surrogates in control. As a result of the dilutions, the surrogate recoveries could not be calculated.

Sample D3K050301-003 was analyzed at a 10-fold dilution to obtain several analytes within the calibration range. All other analytes for this sample are reported from the undiluted analysis with surrogates in control. As a result of the dilution, the surrogate recoveries could not be calculated.

The analytes Benzo(k)fluoranthene and Benzo(a)pyrene were detected in the Method Blank below the reporting limits. No corrective action is taken for values detected in the method blanks below the reporting limits.

The method required MS/MSD could not be performed due to insufficient sample volume. The Laboratory Control Sample was in control.

No other anomalies were observed.

# GC/MS Semivolatiles, Method SW846 8270C SIM

A project-specific lower acceptable recovery limit of 30% for all QC samples and surrogates has been designated for analytical work performed under the 2003 Sampling Plan for the Reilly Industries, Inc. NPL Site. This lower limit is used for this project, rather than historically generated lower recovery limits. All recoveries in this report are above the 30% minimum threshold.

The analytes Benzo(e)pyrene, Fluoranthene, Naphthalene, and Phenanthrene were detected in the Method Blank below the reporting limits. No corrective action is taken for values detected in the method blanks below the reporting limits.

The LCS demonstrated recovery below the control limits for Quinoline. Quinoline has historically shown very poor and erratic recoveries. The holding time had expired and insufficient sample volume remains for re-extraction of the associated sample. Quinoline results should be considered biased low.

The MS/MSD performed on a batch QC sample demonstrated recoveries that were below the control limits for Benzo(e)pyrene and Quinoline. These anomalies may be due to matrix interference.

No other anomalies were observed.

## Data Completeness for Method 8270C Full Scan and SIM Combined

The results contained in the report were reviewed relative to data acceptance criteria as specified in the 2002 QAPP, and the percent completeness was determined below.

DATA COMPLETENESS CALCULATION					
LOT:	LOT: D3K050301				
ANALYSIS: SW846-8270C					
QC Parameter	Data Planned	Valid Data Obtained			
Method Blank	62	62			
MB Surrogates	6	6			
LCS	14	13			
LCS Surrogates	6	- 6			
FB/FBD	NA	NA			
MS	7	5			
MS Surrogates	3	3			
MSD .	7	5			
MSD Surrogates	3	3			
MS/MSD RPD	7	7.			
Sample/Dup, RPD	NA	NA			
Sample Surrogates	9	9			
Samples and QC Internal Standard Area	45	45			
TOTAL	169	164			
% Completeness	97.0%				

<sup>\*</sup>A MS/MSD was performed on sample GAC-SLP4T-110303 (from D3K040195).

# **EXECUTIVE SUMMARY - Detection Highlights**

D3K050301

•				**
		REPORTIN	r <b>Ģ</b>	ANALYTICAL
PARAMETER	RESULT	LIMIT	UNITS	METHOD
SLP6-110403 11/04/03 13:00 001				
Acenaphthene '	100	5.7	ng/L	SW846 8270C SIM
Acenaphthylene	22	4.8	ng/L	SW846 8270C SIM
Anthracene	1.6 J	4.2	ng/L	SW846 8270C SIM
Benzo(b)thiophene	5.5	5.2	ng/L	SW846 8270C SIM
Carbazole	2.5 J	3.8	ng/L	SW846 8270C SIM
Dibenzothiophene	1.8 J	4.1	ng/L	SW846 8270C SIM
2,3-Dihydroindene	78	5.0	ng/L	SW846 8270C SIM
Fluoranthene	2.2 J,B	4.6	ng/L	SW846 8270C SIM
Fluorene	8.1	4.1	ng/L	SW846 8270C SIM
Indene	4.7	4.7	ng/L	SW846 8270C SIM
Indole	5.8	4.7	ng/L	SW846 8270C SIM
2-Methylnaphthalene	1.9 Ј	5.9	ng/L	SW846 8270C SIM
1-Methylnaphthalene	1.5 J	5.6	ng/L	SWB46 B270C SIM
Naphthalene	4.4 J,B	8.6	ng/L	SW846 8270C SIM
Phenanthrene	2.3 J,B	6.3	ng/L	SW846 8270C SIM
Pyrene	1.4 J	4.2	ng/L	SW846 8270C SIM
Acenaphthene	120	10	ug/L	SW846 8270C
Anthracene	2.0 Ј	10	ug/L	SW846 8270C
2,3-Benzofuran	31	10	ug/L	SW846 8270C
Benzo(b)thiophene	99	10	ug/L	SW846 8270C
Biphenyl	19	10	ug/L	SW846 8270C
Carbazole	69	10	ug/L	SW846 8270C
Dibenzofuran	43	10	ug/L	SW846 8270C
Dibenzothiophene	11	10	ug/L	SW846 8270C
2,3-Dihydroindene	230	100	ug/L	SW846 8270C
Fluorene	<b>39</b>	10	ug/L	SW846 8270C
Indene	24	10	ug/L	SW846 8270C
2-Methylnaphthalene	110	10	ug/L	SW846 8270C
l-Methylnaphthalene	110	10	ug/L	SW846 8270C
Naphthalene	1900	200	ug/L	SW846 8270C
Phenanthrene	28	10	ug/L	SW846 8270C
W421-110403 11/04/03 003				
Acenaphthene	340	100	ug/L	SW846 8270C
Acenaphthylene	3.5 J	10	ug/L	SW846 8270C
Acridine	13	10	ug/L	SW846 8270C
Anthracene	150	10	ug/L	SW846 8270C
Benzo(a) anthracene	160	100	ug/L	SW846 8270C
Benzo(b) fluoranthene	110	10	ug/L	SW846 8270C
			<b>~</b> ,	<del></del> .

.(Continued on next page)

# **EXECUTIVE SUMMARY - Detection Highlights**

# D3K050301

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
W421-110403 11/04/03 003				
Benzo(k)fluoranthene	88 B	10	ug/ <b>L</b>	SW846 8270C
Benzo(ghi)perylene	45	10	ug/L	SW846 8270C
Benzo(a) pyrene	110 B	10	ug/L	SW846 8270C
Benzo(e)pyrene	69	10	ug/L	SW846 8270C
Benzo(b)thiophene	. 32	10.	ug/L	SW846 8270C
Biphenyl	37	10	ug/L	SW846 8270C
Carbazole	42	10	ug/L	SW846 8270C
Chrysene	150	10	ug/L	SW846 8270C
Dibenzo(a,h)anthracene	16	10	ug/L	SW846 8270C
Dibenzofuran	170	100	ug/L	SW846 8270C
Dibenzothiophene	<b>72</b> .	10	ug/L	SW846 B270C
2,3-Dihydroindene	110	10	ug/L	SW846 8270C
Fluoranthene	850	100	ug/L	SW846 8270C
Fluorene	270	100	ug/L	SW846 8270C
Indene	34	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	36	10	ug/L	SW846 8270C
2-Methylnaphthalene	100	10	ug/L	SW846 8270C
1-Methylnaphthalene	130	10	ug/L	SW846 8270C
Naphthalene	220	100	ug/L	SW846 8270C
Perylene	23	10	ug/L	SW846 8270C
Phenanthrene	1100	100	ug/L	SW846 8270C
Pyrene	630	100	ug/L	SW846 8270C

# **METHODS SUMMARY**

# D3K050301

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Base/Neutrals and Acids	SW846 8270C SIM	SW846 3520C
Semivolatile Organic Compounds by GC/MS	SW846 8270C	SW846 3520C

## References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# **METHOD / ANALYST SUMMARY**

## D3K050301

METHOD	ANALYST	analyst ID
SW846 8270C SW846 8270C SIM	Tim O'Donnell Tim O'Donnell	000443 000443

#### References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

#### D3K050301

WO # S	SAMPLE#	CLIENT SAMPLE ID		SAMPLED DATE	SAMP TIME
F37DM F37DQ	001 002	SLP6-110403 W420-110403		11/04/03 11/04/03	13:00
F37DT	003	W421-110403	•	11/04/03	•

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis; color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# Client Sample ID: W420-110403

# GC/MS Semivolatiles

Lot-Sample #: D3K050301-002 Date Sampled: 11/04/03 Prep Date: 11/11/03 Prep Batch #: 3315270 Dilution Factor: 1	Work Order #: Date Received: Analysis Date: Analysis Time: Method	11/05/03 12/08/03 20:35	Matrix,	: WG	
			. •		
		REPORTING		1	
PARAMETER	RESULT	LIMIT	UNITS	•	
Acenaphthene	120	10	ug/L		
Acenaphthylene	ND	10	ug/L		
Acridine	NO NO	10	ug/L		
Anthracene	2.0 J	10	ug/L		
Benzo (a) anthracene	ND	10	ug/L		
Benzo(b) fluoranthene	ND	10	ug/L		
Benzo(k) fluoranthene	ND	10	ug/L		
2,3-Benzofuran	31	10	ug/L		
Benzo(ghi)perylene	ND	10	ug/L		
Benzo(a) pyrene	ND	10 .	ug/L		
Benzo(e)pyrene .	ND	10	ug/L		
Benzo(b)thiophene	99	10	ug/L		
Biphenyl	19	10	ug/L		
Carbazole	`6 <b>9</b>	10	ug/L		
Chrysene	ND	10	ug/L		
Dibenzo(a,h)anthracene	ΜD	10	ug/L		
Dibenzofuran	43	10	ug/L		
Dibenzothiophene	11	10	ug/L		
Fluoranthene	ND	10	ug/L		
Fluorene	39	10	ug/L		
Indene	24	10	ug/L		
Indeno (1,2,3-cd) pyrene	ND .	10	ug/L	•	
Indole	ND	10 .	ug/L		
2-Methylnaphthalene	110	10	ug/L		
1-Methylnaphthalene	1.10	10	ug/L		
Perylene	ND	10	ug/L		
Phenanthrene	28	10	ug/L	•	-
Pyrene	ND	10	ug/L		
Quinoline	ND .	10	ug/Ľ		
		•	•	• .	
	PERCENT	RECOVERY	٠.		
SURROGATE	RECOVERY	LIMITS			
Chrysene-dl2	51 ·	(30 - 160)			
Fluorene d-10	53	(36 - 127)			
Naphthalene-d8	53	(37 - 107)			

J Estimated result. Result is less than RL.

# Client Sample ID: W420-110403

# GC/MS Semivolatiles

Lot-Sample #: D3K050301-002 Date Sampled: 11/04/03 Prep Date: 11/11/03 Prep Batch #: 3315270 Dilution Factor: 10	Work Order #: Date Received: Analysis Date: Analysis Time:	11/05/03 12/09/03	Matrix WG
	Method:	SW846 8270	С
PARAMETER 2,3-Dihydroindene	RESULT 230	REPORTING LIMIT 100	UNITS ug/L
SURROGATE Chrysene-d12 Fluorene d-10 Naphthalene-d8	PERCENT RECOVERY NC, DIL NC, DIL NC, DIL	RECOVERY LIMITS (30 - 160) (36 - 127) (37 - 107)	· .

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

# Client Sample ID: W420-110403

# GC/MS Semivolatiles

Lot-Sample #: D3K050301-00 Date Sampled: 11/04/03 Prep Date: 11/11/03 Prep Batch #: 3315270 Dilution Factor: 20	Work Order # Date Received Analysis Date Analysis Time Method	: 11/05/03 : 12/09/03 : 13:10	Matrix: WG
PARAMETER Naphthalene	RESULT 1900	REPORTING LIMIT 200	UNITS ug/L
	PERCENT	RECOVERY	·
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	•
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	
Morra (a)	•		

NC The recovery and/or RPD were not calculated.

DIL. The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

## Client Sample ID: W421-110403

## GC/MS Semivolatiles

Matrix..... WG

Lot-Sample #...: D3K050301-003 Work Order #...: F37DT1AA

Date Sampled: 11/04/03	Date Received:			
Prep Date: 11/11/03	Analysis Date:	12/08/03		
Prep Batch #: 3315270	Analysis Time:	23:44		
Dilution Factor: 1				
	Method:	SW846 8270	C	
		REPORTING		
PARAMETER	RESULT	<u>LIMIT</u>	UNITS	
Acenaphthylene	3.5 J	10	ug/L	
Acridine	13	10	ug/L	
Anthracene	150	10	ug/L	
Benzo(b) fluoranthene	110	10	ug/L	
Benzo(k) fluoranthene	88 B	10	ug/L	
2,3-Benzofuran	ND	10	ug/L	
Benzo(ghi)perylene	45	1.0	ug/L	
Benzo(a) pyrene	110 B	10	ug/L	
Benzo(e)pyrene	69	10	ug/L	
Benzo (b) thiophene	32	10	ug/L	
Biphenyl	37	10	ug/L	
Carbazole	42	10	ug/L	
Chrysene	150	10	ug/L	
Dibenzo (a, h) anthracene	16	10	ug/L	
Dibenzothiophene	72	10	ug/L	
2,3-Dihydroindene	110	10	ug/L	
Indene	34	10	ug/L	
Indeno(1,2,3-cd)pyrene	36	10	ug/L	
Indole	ND	10	ug/L	•
2-Methylnaphthalene	100	10	ug/L	
1-Methylnaphthalene	130	10	ug/L	
Perylene	23	10	ug/L	
Quinoline	ND	10	ug/L	
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Chrysene-d12	74	(30 - 160)	_	
Fluorene d-10	51	(36 - 127)		
Naphthalene-d8	58	(30 - 127)	•	
мариснатене-ив	20	(3) - 70/)	·	

I Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

# Client Sample ID: W421-110403

## GC/MS Semivolatiles

Lot-Sample #: D3K050301-003	Work Order #:	F37DT2AA	Matrix: WG
Date Sampled: 11/04/03	Date Received:	11/05/03	
Prep Date: 11/11/03	Analysis Date:	12/08/03	
Prep Batch #: 3315270	Analysis Time:	21:13	
Dilution Factor: 10			
•	Method:	SW846 8270	C .
. :		REPORTING	
	<u>-</u>	•	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	340	100	ug/L
Benzo (a) anthracene	160	100	ug/L
Dibenzofuran	170	100	ug/L
Fluoranthene	850	100	ug/L
Fluorene	270	100	ug/L
Naphthalene	220	100	ug/L
Phenanthrene	1100	100	ug/L
Pyrene	630	1.00	ug/L
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-d12	NC, DIL	(30 - 160)	
Fluorene d-10	NC, DIL	(36 - 127)	
Naphthalene-d8	NC, DIL	(37 - 107)	

NC The recovery and/or RPD were not calculated.

DIL. The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

## Client Sample ID: SLP6-110403

## GC/MS Semivolatiles

Lot-Sample #...: D3K050301-001 Work Order #...: F37DM1AA

Matrix....: WG

TOC-Sample #: D3K020301-001	work Order #:		MacLLX WG
Date Sampled: 11/04/03	Date Received:		•
Prep Date: 11/07/03	Analysis Date:	12/05/03	
Prep Batch #: 3312127	Analysis Time:	13:45	•
Dilution Factor: 1			
	Method:	SW846 8270	C SIM
		REPORTING	
PARAMETER	RESULT	LIMIT	UNITS
Acenaphthene	100	5.7	ng/L
Acenaphthylene	22	4.8	ng/L
Acridine	ND	6.2	ng/L
Anthracene	1.6 Ј	4.2	ng/L
Benzo(a) anthracene	ND	4.3	ng/L
Benzo(b) fluoranthene	ND	4.7	ng/L .
Benzo(k) fluoranthene	ND	4.1	ng/L
2,3-Benzofuran	ND	5.4	ng/L
Benzo(ghi)perylene	ND	6.2	ng/L
Benzo(a)pyrene	ND	2.5	ng/L
Benzo(e)pyrene	ND	4.3	ng/L
Benzo(b) thiophene	5.5	5.2	ng/L
Biphenyl	ND	5.6	ng/L
Carbazole	2.5 J	3.8	ng/L
Chrysene	ND	5.6	ng/L
Dibenzo(a,h)anthracene	ND	5.9	ng/L
Dibenzofuran	ND	5.7	ng/L
Dibenzothiophene	1.8 J	4.1	ng/L
2,3-Dihydroindene	78	5.0	ng/L
Fluoranthene	2.2 J,B	4.6	ng/L
Fluorene	8.1	4.1	ng/L
Indene	4.7	4.7	ng/L
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L
Indole	5.8	4.7	ng/L
2-Methylnaphthalene	1.9 J	5.9	ng/L
1-Methylnaphthalene	1.5 J	5.6	ng/L
Naphthalene	4.4 J,B	8.6	ng/L
Perylene	ND	3.3	ng/L
Phenanthrene	2,3 J,B	6.3	ng/L
Pyrene	1.4 J	4.2	ng/L
Quinoline	ND	9.0	ng/L
and the second of the second o	er er er er er er er er er er er er er e		
	PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS	
Chrysene-dl2	58	(30 - 118)	·
Fluorene d-10	74	(41 - 162)	• • •
Naphthalene-d8	71	(30 - 108)	

NOTE (S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

# **QC DATA ASSOCIATION SUMMARY**

# D3K050301

# Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	SW846 8270C SIM		3312127	3312015
002	WG	SW846 8270C		3315270	
003	WG	SW846 8270C		3315270	

## METROD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3K050301

Work Order #...: F4JVW1AA

Matrix..... WATER

MB Lot-Sample #: D3K110000-270

Prep Date....: 11/11/03 Prep Batch #...: 3315270 Analysis Time..: 19:19

Analysis Date .: 12/08/03

Dilution Factor: 1

		REPORTI	NG	
PARAMETER	RESULT	LIMIT	UNITS	METHOD_
Acenaphthene	ND	10	ug/L	SW846 8270C
Acenaphthylene	ND	10	ug/L	SW846 B270C
Acridine	ND	10	ug/L	SW846 8270C
Anthracene	ND	10	ug/L	SW846 8270C
Benzo(a)anthracene	ND	10	ug/L	SW846 8270C
Benzo(b) fluoranthene	ND	10	ug/L	SW846 8270C
Benzo(k) fluoranthene	1.2 J	10	ug/L	SW846 8270C
2,3-Benzofuran	ND	10	ug/L	SW846 8270C
Benzo(ghi)perylene	ND	10	ug/L	SW846 8270C
Benzo (a) pyrene	1.1 J	10	ug/L	SW846 8270C
Benzo(e)pyrene	ND	10	ug/L	SW846 8270C
Benzo(b) thiophene	ND	10	ug/L	SW846 8270C
Biphenyl	ND	10	ug/L	SW846 8270C
Carbazole	ND	10	ug/L	SW846 8270C
Chrysene	ND	10	ug/L	SW846 8270C
Dibenzo (a, h) anthracene	ND	10	ug/L	SW846 8270C
Dibenzofuran	ND	10	ug/L	SW846 8270C
Dibenzothiophene	ND	10	ug/L	SW846 8270C
2,3-Dihydroindene	ND	10	ug/L	SW846 8270C
Fluoranthene	ND	10	ug/L	SW846 8270C
Fluorene	ND	10	ug/L	SW846 8270C
Indene	ND	10	ug/L	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	10	ug/L	SW846 8270C
Indole	ND	10	ug/L	SW846 8270C
2-Methylnaphthalene	ND	10	ug/L	SW846 8270C
1-Methylnaphthalene	ND	10	ug/L	SW846 8270C
Naphthalene	ND	10	ug/L	SW846 8270C
Perylene	ИD	10	ug/L	SW846 8270C
Phenanthrene	ND	10	ug/L	SW846 8270C
Pyrene	ND	10	ug/L	SW846 8270C
Quinoline	ND	10	ug/L	SW846 8270C
	PERCENT	RECOVER	Y	•
SURROGATE	RECOVERY	LIMITS		· · · · · · · · · · · · · · · · · · ·
Chrysene-d12	60	(30 - 10	60)	
Fluorene d-10	48	(36 - 1	27)	
Naphthalene-d8	· 56	$(3^{\circ}7 - 1)$	07)	

NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

<sup>#</sup> Estimated result. Result is less than RL.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## GC/MS Semivolatiles

Client Lot #...: D3K050301 Work Order #...: F4JVW1AC Matrix.....: WATER

LCS Lot-Sample#: D3K110000-270

Prep Date...: 11/11/03 Analysis Date.: 12/08/03
Prep Batch #..: 3315270 Analysis Time.: 19:57

Dilution Factor: 1

	PERCENT	RECOVERY	
PARAMETER	RECOVERY	LIMITS	METHOD
Benzo(e)pyrene	66	(30 - 150)	SW846 8270C
Chrysene	63	(43 - 124)	SW846 8270C
Fluorene	72	(51 - 120)	SW846 8270C
Indene	63	(49 - 108)	SW846 8270C
2-Methylmaphthalene	65	(47 - 138)	SW846 8270C
Naphthalene	70	(43 - 128)	SW846 8270C
Quinoline	68	(40 - 126)	SW846 8270C
		PERCENT	RECOVERY
SURROGATE		RECOVERY	LIMITS
Chrysene-d12		60	(30 - 160)
Fluorene d-10		55	(36 - 127)
Naphthalene-d8		66	(37 - 107)

## NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results. Bold print denotes control parameters

## LABORATORY CONTROL SAMPLE DATA REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3K050301 Work Order #...: F4JVW1AC Matrix.....: WATER

LCS Lot-Sample#: D3K110000-270

 Prep Date....: 11/11/03
 Analysis Date..: 12/08/03

 Prep Batch #...: 3315270
 Analysis Time..: 19:57

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo(e)pyrene	50.0	32.8	ug/L	66	SW846 8270C
Chrysene	50.0	31.6	ug/L	63	SW846 8270C
Fluorene	50.0	36.0	ug/L	72	SW846 8270C
Indene	50.0	31.4	ug/L	63	SW846 8270C
2-Methylnaphthalene	50.0	32.6	ug/L	65	SW846 8270C
Naphthalene	50.0	34.9	ug/L	70	SW846 8270C
Quinoline	50.0	33.8	ug/L	68	SW846 8270C

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-dl2	60	(30 - 160)
Fluorene d-10	55	(36 - 127)
Naphthalene-d8	66	(37 - 107)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

## METHOD BLANK REPORT

## GC/MS Semivolatiles

Client Lot #...: D3K050301

Work Order #...: F4FHD1AA

Matrix....: WATER

MB Lot-Sample #: D3K080000-127

Prep Date....: 11/07/03 Prep Batch #...: 3312127

Analysis Time..: 18:05

Analysis Date..: 12/04/03

Dilution Factor: 1

		REPORTI	NG .			
PARAMETER	RESULT	LIMIT	UNITS	METHO	D	
Acenaphthene	ND	5.7	ng/L .	SW846	8270C	SIM
Acenaphthylene	ND	4.8	ng/L	SW846	8270C	SIM
Acridine	ND	6.2	ng/L	SW846	8270C	SIM
Anthracene ·	ND	4.2	ng/L	SW846	8270C	SIM
Benzo (a) anthracene	ND	4.3	ng/L	SW846	B270C	SIM
Benzo(b) fluoranthene	ND	4.7	ng/L	SW846	8270C	SIM
Benzo(k) fluoranthene	ND	4.1	ng/L	SW846	8270C	SIM
2,3-Benzofuran	ND	5.4	ng/L	SW846	8270C	SIM
Benzo(ghi)perylene	ND	6.2	ng/L	SW846	8270C	SIM
Benzo(a) pyrene	ND	2.5	ng/L	SW846	8270C	SIM
Benzo (e) pyrene	1.0 J	4.3	ng/L	SW846	8270C	SIM
Benzo(b)thiophene	ND	5.2	ng/L	SW846	8270C	SIM
Biphenyl	ND	5.6	ng/L	SW846	8270C	SIM
Carbazole	ND	3.8	ng/L	SW846	8270C	SIM
Chrysene	, ND	5.6	ng/L	SW846	8270C	SIM
Dibenzo(a,h)anthracene	ND	5.9	ng/L	SW846	8270C	SIM
Dibenzofuran	ND	5.7	ng/L	· SW846	8270C	SIM
Dibenzothiophene	ND	4.1	ng/L	SW846	8270C	SIM
2,3-Dihydroindene	ND	5.0	ng/L	SW846	8270C	SIM
Fluoranthene	1.2 J	4.6	ng/L	SW846	8270C	SIM
Fluorene	ND	4.1	ng/L	SW846	8270C	SIM
Indene	ND	4.7	ng/L	SW846	8270C	SIM
Indeno(1,2,3-cd)pyrene	ND	5.4	ng/L	SW846	8270C	SIM
Indole	ND	4.7	ng/L	SW846	8270C	SIM
2-Methylnaphthalene	ND	5.9	ng/L	SW846	8270C	SIM
1-Methylnaphthalene	ND	5.6	ng/L	SW846	8270C	SIM
Naphthalene	1.1 J	8.6	ng/L	SW846	8270C	SIM
Perylene	ND	3.3	ng/L	SW846	8270C	SIM
Phenanthrene	. 1.4 Ј	6.3	ng/L	SW846	8270C	SIM
Pyrene .	ND	4.2	ng/L	SW846	8270C	SIM
Quinoline	ND	9.0	ng/L	SW846	8270C	SIM
	PERCENT	RECOVER'	Y .	•		•
SURROGATE	RECOVERY	LIMITS			•	. •
Chrysene-d12	73	(30 - 1	•			
Fluorene d-10	58	(41 - 1	62)			

SURROGATE	RECOVERY	LIMITS		
Chrysene-dl2	73	(30 - 118)		
Fluorene d-10	58	(41 - 162)		
Naphthalene-d8	75	(30 - 108)		

Calculations are performed before rounding to avoid round-off errors in calculated results.

J Estimated result. Result is less than RL.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3K050301 Work Order #...: F4FHD1AC Matrix.....: WATER

LCS Lot-Sample#: D3K080000-127

Prep Date....: 11/07/03 Analysis Date..: 12/04/03
Prep Batch #...: 3312127 Analysis Time..: 18:42

Dilution Factor: 1

	PERCENT	RECOVERY		
PARAMETER	RECOVERY	LIMITS	METHOD	
Benzo(e)pyrene	78	(30 - 150)	SW846 8270C SIM	
Chrysene	72	(30 - 132)	SW846 8270C SIM	
Fluorene	75	(30 - 132)	SW846 8270C SIM	
Indene	67	(30 - 150)	SW846 8270C SIM	
2-Methylnaphthalene	77	(30 - 150)	SW846 8270C SIM	
Naphthalene	91	(30 - 150)	SW846 8270C SIM	
Quinoline	0.0 a	(30 - 150)	SW846 8270C SIM	
		PERCENT	RECOVERY	
SURROGATE		RECOVERY	LIMITS	

	PERCENT	KECOVERI
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	87	(30 - 118)
Fluorene d-10	66	(41 - 162)
Naphthalene-d8	79	(30 - 108)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

## LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3K050301 Work Order #...: F4FHD1AC Matri

Matrix....: WATER

LCS Lot-Sample#: D3K080000-127

Prep Date....: 11/07/03

Analysis Date..: 12/04/03

Prep Batch #...: 3312127 Analysis Time..: 18:42

Dilution Factor: 1

	SPIKE	MEASURED		PERCENT	
PARAMETER	AMOUNT	AMOUNT	UNITS	RECOVERY	METHOD
Benzo(e)pyrene	10.0	7.82	ng/L	78	SW846 8270C S
Chrysene	10.0	7.25	ng/L	72	SW846 8270C S
Fluorene	10.0	7.52	ng/L	75	SW846 8270C S
Indene	10.0	6.74	ng/L	67	SW846 8270C S
2-Methylnaphthalene	10.0	7.73	ng/L	77	SW846 8270C S
Naphthalene	10.0	9.10	ng/L	91	SW846 8270C S
Quinoline	10.0	0.0 a	ng/L	0.0	SW846 8270C S
		PERCENT	RECOVERY		
SURROGATE		RECOVERY	LIMITS		

	PERCENT	RECOVERY				
SURROGATE	RECOVERY	LIMITS				
Chrysene-d12	87	(30 - 118)				
Fluorene d-10	66	(41 - 162)				
Naphthalene-d8	79	(30 - 108)				

#### NOTE (S)

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

## MATRIX SPIKE SAMPLE EVALUATION REPORT

#### GC/MS Semivolatiles

Client Lot #...: D3K050301 Work Order

Work Order #...: F33971AC-MS

MS Lot-Sample #: D3K040195-005

F33971AD-MSD

Matrix ..... WATER

Date Sampled...: 11/03/03

Date Received..: 11/04/03

Prep Date....: 11/07/03

Analysis Date..: 12/04/03

Prep Batch #...: 3312127

Analysis Time..: 23:39

Dilution Factor: 1

	PERCENT	RECOVERY		RPD	
PARAMETER	RECOVERY	LIMITS	RPD	LIMITS	METHOD
Benzo(e)pyrene	0.0 a	(30 - 150)			SW846 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
Chrysene	34	(30 - 132)			SW846 8270C SIM
_	34	(30 - 132)	10	(0-50)	SW846 8270C SIM
Fluorene	54	(30 - 132)			SW846 B270C SIM
	57	(30 - 132)	3.8	(0-50)	SW846 8270C SIM
Indene	56	(30 - 150)			SW846 8270C SIM
	61	(30 - 150)	0.25	(0-50)	SW846 8270C SIM
2-Methylnaphthalene	63	(30 - 150)	-		SW846 8270C SIM
	68	(30 - 150)	0.50	(0~50)	SW846 8270C SIM
Naphthalene	62	(30 - 150)			SW846 8270C SIM
	67	(30 - 150)	0.20	(0-50)	SW846 8270C SIM
Quinoline	0.0 a	(30 - 150)			SW846 8270C SIM
	0.0 a	(30 - 150)	0.0	(0-50)	SW846 8270C SIM
		PERCENT		RECOVERY	
SURROGATE		RECOVERY		LIMITS	
Chrysene-d12	<del></del>	49		(30 - 118)	3)
		43		(30 - 118	3)
Fluorene d-10	-	48		(41 - 162	2)
•	•	49		(41 - 162	2)
Naphthalene-d8		60		(30 - 108	3)
		64		(30 - 108	3)

#### NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

#### MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Semivolatiles

Client Lot #...: D3K050301 Work Order #...: F33971AC-MS Matrix...... WATER

MS Lot-Sample #: D3K040195-005 F33971AD-MSD

Date Sampled...: 11/03/03 Date Received..: 11/04/03

Prep Date....: 11/07/03 Analysis Date..: 12/04/03

Prep Batch #...: 3312127 Analysis Time..: 23:39

Dilution Factor: 1

	SAMPLE	SPIKE	MEASRD		PERCNT		
PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	RECVRY	RPD	METHOD
Benzo(e)pyrene	ND	10.6	0.0	ng/L	0.0 a		SW846 8270C SIM
	ND	9.76	0.0	ng/L	0.0 a	0.0	SW846 8270C SIM
Chrysene	ND	10.6	3.64	ng/L	34		SW846 8270C SIM
	ND	9.76	3.29	ng/L	34	10	SW846 8270C SIM
Fluorene	ND	10.6	5.74	ng/L	54		SW846 8270C SIM
	ND	9.76	5.52	ng/L	57	3.8	SW846 8270C SIM
Indene	ND	10.6	6.00	ng/L	56		SW846 8270C SIM
	ND	9.76	5.99	ng/L	61.	0.25	SW846 8270C SIM
2-Methylnaphthalene	ND	10.6	6.71	ng/L	63		SW846 8270C SIM
	ND	9.76	6.68	ng/L	68	0.50	SW846 8270C SIM
Naphthalene	1.6	10.6	8.24	ng/L	62		SW846 8270C SIM
	1.6	9.76	8.22	ng/L	67	0.20	SW846 B270C SIM
Quinoline	ND	10.6	0.0	ng/L	0.0 a		SW846 8270C SIM
	MD	9.76	0.0	ng/L	0.0 a	0.0	SW846 8270C SIM

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Chrysene-d12	49	(30 - 118)
	43	(30 - 118)
Fluorene d-10	48	(41 - 162)
	49	(41 - 162)
Naphthalene-d8	60	(30 - 108)
·	64	(30 - 108)

## NOTE (S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

a Spiked analyte recovery is outside stated control limits.

# Chain of Custody Record

3. # 11-5



Severn Trent Laboratories, Inc.

STL Denver 4955 Yarrow Street Arvada, CO 80002

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#### **DATA QUALITY ASSESSMENT**

STL Project # D3K050301 (W)

March 9, 2004

Site: Reilly Site, St. Louis Park, MN

ENSR Project # 01620-032-600

Client: City of St. Louis Park

#### SUMMARY

A data assessment was performed on the data for the analyses of one aqueous sample for part per trillion (ppt) polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 8270C SIM and two samples for part per billion (ppb) for the same analysis. The samples were collected on November 4, 2003 at the Reilly Site in St. Louis Park, MN. The samples were submitted to Severn Trent Laboratories (STL) in Denver, CO for analysis. STL processed and reported the results under lot number D3K050301.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (10/99), and "2003 Sampling Plan Reilly Tar & Chemical Corp. N.P.L Site, St. Louis Park, Minnesota", 10/2002. Modification of the Functional Guidelines was done to accommodate the non-CLP methodologies.

#### **SAMPLES**

The samples included in this review are listed below:

SLP6-110403

W420-110403

W421-110403

#### **REVIEW ELEMENTS**

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Method blanks
- Surrogate spike recoveries
- Laboratory control sample (LCS) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Quantitation limits and sample results



#### DISCUSSION

## **Agreement of Analyses Conducted with COC Requests**

The sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. There were no discrepancies to report.

#### **Holding Times and Sample Preservation**

The samples were extracted and analyzed within the method specified holding times.

The cooler temperature upon receipt at the laboratory was 3.7°C. All cooler temperatures were within the QC criteria of between 2-6°C.

#### Method Blanks

There was one method blank for this data package, prep batch 3312127. There were two target analytes detected in the laboratory method blank for the ppb analysis and four compounds detected in the method blank for the ppt analysis. Each of the compounds was detected below the action levels.

## **Surrogate Spike Recoveries**

The percent recoveries of the surrogates were within the QC acceptance criteria in all sample analyses.

#### **LCS Results**

The percent recoveries of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses except for quinoline. Quinoline was detected at 0% and fell outside the control limits of 30-150.

#### MS/MSD Results

MS/MSD analyses were performed on a sample from a different data set (D3K040195). All percent recoveries and relative percent differences (RPDs) were within the acceptable range with the exception of benzo(e)pyrene and quinoline. The table below outlines the percent recoveries and RPDs that were outside the control limits.

Compound	%R MS/MSD	RPD (%)	MS-MSD/RPD QC Limits
Benzo(e)pyrene	0/0	ok	30-150/0-50
Quinoline	0/0	ok	30-150/0-50

#### **Field Duplicate Results**

No sample duplicates were submitted with this data package.



## **Quantitation Limits and Sample Results**

There were two samples diluted due to elevated concentrations of target analytes. Sample quantitation limits (SQLs) were properly adjusted.

A total of three SQLs exceeded the required QAPP SQLs on Table A-1. They are anthracene at 4.2ng/l (3.4ng/l required), benzo(k)fluoranthene at 4.1ng/l (3.9ng/l required), and phenanthrene at 6.3ng/l (4.7ng/l required). All other laboratory reported quantitation limits were at or below the reporting limits required by the QAPP.